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**The Pennsylvania State  
University Bulletin**

**Associate Degree Programs**

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# **THE PENNSYLVANIA STATE UNIVERSITY BULLETIN**

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## **ASSOCIATE DEGREE PROGRAMS**

### **REGULATIONS SUBJECT TO CHANGE**

The educational process necessitates change. This bulletin must be considered as informational and not binding on the University.

Each step of the educational process, from admission through graduation, requires continuing review and appropriate approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation.

### BACCALAUREATE DEGREE MAJORS

**LOCATIONS**  
ALLENTOWN  
ALTOONA  
BEAVER  
BEHREND COLLEGE  
BERKS  
DELAWARE COUNTY  
DuBOIS  
FAYETTE  
HAZLETON  
McKEESPORT  
MONT ALTO  
NEW KENSINGTON  
OGONTZ  
SCHUYLKILL  
SHENANGO VALLEY  
UNIVERSITY PARK  
WILKES-BARRE  
WORTHINGTON  
YORK

Aerospace Engineering Technology  
 Agricultural Business (1st yr. only)  
 Agricultural Business (2nd yr. only)  
 Air Pollution Control Engr. Tech. (1st & 2nd yr.)  
 Air Pollution Control Engr. Tech. (1st yr.)  
 Architectural Engineering Technology  
 Biomedical Equipment Tech. (1st & 2nd yr.)  
 Biomedical Equipment Tech. (1st yr.)  
 Business Administration  
 Chemical Engineering Technology  
 Community Services\*  
 (Administration of Justice)  
 Computer Science  
 Electrical Engineering Technology  
 Forest Technology  
 Highway Engineering Technology  
 Hotel and Food Service  
 Labor Studies\*  
 Letters, Arts, and Sciences\*  
 Mass Communications — Broadcasting  
 Mass Communications — Journalism  
 Mechanical Engineering Technology  
 (Drafting and Design Technology)  
 Medical Laboratory Technology  
 Mining Technology  
 Nuclear Engineering Tech. (1st & 2nd yr.)  
 Nuclear Engineering Tech. (1st yr.)  
 Nursing  
 Recreation and Parks  
 Retailing  
 Sociology\*  
 Steel Technology  
 Surveying Technology  
 Wildlife Technology

**\*\*Four years of all baccalaureate degree majors.**

## **PENN STATE COMMONWEALTH CAMPUSES**

**\*UNIVERSITY PARK CAMPUS** University Park, PA 16802  
Area Code 814 865-4700

**ALLENTOWN CAMPUS** Fogelsville School Building, Fogelsville, PA 18051  
Area Code 215 395-6851

**ALTOONA CAMPUS** Smith Building, Altoona, PA 16603  
Area Code 814 944-4547

**BEAVER CAMPUS** Brodhead Road, Monaca, PA 15061  
Area Code 412 775-8830

**\*BEHREND COLLEGE** Erie (Station Rd., Wesleyville), PA 16510  
Area Code 814 899-3101

**BERKS CAMPUS** R.D. 5, Tulpehocken Road, Reading, PA 19608  
Area Code 215 375-4211

**\*CAPITOL CAMPUS** Middletown, PA 17057  
Area Code 717 787-7734

**DELAWARE COUNTY CAMPUS** 25 Yearsley Mill Road, Media, PA 19063  
Area Code 215 565-3300

**DuBOIS CAMPUS** College Place, DuBois, PA 15801  
Area Code 814 371-2800

**FAYETTE CAMPUS** P.O. Box 519, Uniontown, PA 15410  
Area Code 412 437-2801

**HAZLETON CAMPUS** Highacres, Hazleton, PA 18201  
Area Code 717 454-8731

**McKEESPORT CAMPUS** University Drive, McKeesport, PA 15132  
Area Code 412 678-9501  
Area Code 412 462-6401

**MONT ALTO CAMPUS** Mont Alto, PA 17237  
(Waynesboro) Area Code 717 749-3111

**NEW KENSINGTON CAMPUS** 3550 7th Street Rd., New Kensington, PA 15068  
Area Code 412 339-1031

**OGONTZ CAMPUS** 1600 Woodland Road, Abington, PA 19001  
Area Code 215 886-9400

**SCHUYLKILL CAMPUS** State Highway, Schuylkill Haven, PA 17972  
Area Code 717 385-4500

**SHENANGO VALLEY CAMPUS** Shenango and Reno Streets, Sharon, PA 16146  
Area Code 412 981-1640

**WILKES-BARRE CAMPUS** P.O. Box 1830, Wilkes-Barre, PA 18708  
Area Code 717 675-2171

**WORTHINGTON SCRANTON CAMPUS** 120 Ridge View Drive, Dunmore, PA 18512  
Area Code 717 961-4757

**YORK CAMPUS** 1031 Edgecomb Ave., York, PA 17403  
Area Code 717 854-3632

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\*Upper-division and graduate courses

**THE PENNSYLVANIA STATE UNIVERSITY BULLETIN**

**VOLUME LXX** December 1976 **NUMBER 3**

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## **\*UNIVERSITY CALENDAR**

### **WINTER TERM 1977**

#### **DECEMBER 1976**

- 2 Thursday — Classes Begin 8:00 A.M.
- 22 Wednesday — Christmas and New Year's Recess Begins 9:55 P.M.

#### **JANUARY 1977**

- 3 Monday — Winter Term Classes Resume 8 A.M.

#### **FEBRUARY**

- 19 Saturday — Classes End 12:25 P.M.

### **SPRING TERM 1977**

#### **MARCH**

- 10 Thursday — Classes Begin 8:00 A.M.

#### **MAY**

- 18 Wednesday — Classes End 9:55 P.M.

### **SUMMER TERM 1977**

#### **JUNE**

- 8 Wednesday — Classes Begin 8:00 A.M.

#### **JULY**

- 4 +Monday — Independence Day Recess (No Classes)

#### **AUGUST**

- 17 +Wednesday — Classes End 9:55 P.M.

### **FALL TERM 1977**

#### **SEPTEMBER**

- 6 Tuesday — Classes Begin 8:00 A.M.

#### **NOVEMBER**

- 14 Monday — Classes End 9:55 P.M.

### **WINTER TERM 1978**

#### **DECEMBER**

- 1 Thursday — Classes Begin 8:00 A.M.
- 20 Tuesday — Christmas and New Year's Recess Begins 9:55 P.M.

#### **JANUARY 1978**

- 4 Monday — Winter Term Classes Resume 8:00 A.M.

#### **FEBRUARY**

- 22 Wednesday — Classes End 9:55 P.M.

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\*This calendar was approved April 23, 1976, and is subject to change without notice. Although the University makes every effort to avoid conflicts with religious holidays in preparing the calendar for an academic year, such conflicts are sometimes unavoidable. When they occur, efforts are made to make special arrangements for the students affected.

+Monday, July 4, 1977, classes will meet according to schedule on Wednesday, August 17, 1977.



# UNIVERSITY ADMINISTRATION

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## TWO-YEAR ASSOCIATE DEGREE MAJORS

The two-year associate degree majors provide concentrated instruction to prepare graduates for specialized assignments in business and industry or to give students a basic two-year education. These majors are offered at Commonwealth Campus locations as listed on page 3 of this bulletin. In addition, the Commonwealth Campuses offer up to two years of work in most of the baccalaureate degree majors offered by the University.

At present the University offers two-year majors in Agricultural Business; Biomedical Equipment Technology; Business Administration; Community Services; Computer Science; Forest Technology; Hotel and Food Service; Labor Studies; Letters, Arts, and Sciences; Mass Communications—Broadcasting; Mass Communications—Journalism; Medical Laboratory Technology; Nursing; Recreation and Parks; Retailing; Sociology; Wildlife Technology; and eleven areas of engineering: Aerospace Engineering Technology; Air Pollution Control Engineering Technology; Architectural Engineering Technology; Chemical Engineering Technology; Electrical Engineering Technology; Highway Engineering Technology; Mechanical Engineering Technology; Mining Technology; Nuclear Engineering Technology; Steel Technology; and Surveying Technology.

A description of the purposes, objectives, and content of each of the two-year majors is given on succeeding pages.

Most of Penn State's associate degree enrollment at present is concentrated in its engineering technology majors. The engineering technology graduate, a specialist in applied rather than theoretical engineering, is equipped to translate creative ideas into new machines, products, structures, and processes. He understands the basic scientific principles which are the tools of the graduate engineer and is acquainted with the production tools and materials of this skilled worker.

**STATEMENT OF BASIC ACADEMIC ADMISSIONS POLICIES**—Admission to University credit courses or degree candidacy at The Pennsylvania State University is governed by policies established by the University Faculty Senate. Although specific applications of these policies may vary from year to year, from location to location, and from program to program, all University admissions are governed by the following general policies:

1. As an institution of higher education, The Pennsylvania State University is committed to making post-high school education available to all who possess a high school diploma or its equivalent without restriction as to race, sex, religion, color, ancestry, age, or national origin.
2. The primary responsibility of the University is to residents of the Commonwealth of Pennsylvania. Consequently, within limits expressed from time to time by the Board of Trustees of the University, preference shall be given to Pennsylvania residents in the various admission processes.
3. In order to meet the variety of goals and objectives of the population, the spectrum of offerings is designed to enable persons with a variety of objectives — both degree and nondegree — to receive higher education. Although access to educational opportunities of the University is open to all, courses offered for credit are available to those holding a high school diploma or its equivalent. Policies governing admission to degree candidacy are established by the University Faculty Senate (with delegation of policies governing admissions to graduate programs to the Graduate Faculty of the University) under a general policy of offering admissions to those whose past academic performance indicates a reasonable probability of success.
4. Students are admitted to undergraduate degree candidacy in four categories: freshman (1) baccalaureate and (2) associate degree candidacy; advanced standing (3) baccalaureate and (4) associate degree candidacy. To be admitted to undergraduate degree candidacy through one of these four categories, the individual must present an academic performance record which indicates a reasonable probability of success in his or her chosen program. In the case

## TWO-YEAR ASSOCIATE DEGREE MAJORS

of freshman admission to undergraduate degree candidacy, performance is measured through the high school record and standardized test results. In the case of advanced standing admission, performance is measured either through success in nondegree programs and courses of the University or by success at some other institution of higher education.

5. Within the space available in particular programs and at particular locations, admissions shall be offered preferentially to those whose performance record indicates the highest probability of success in the chosen program — with this process continuing until all available spaces are filled. Although exceptions to this policy may be made from time to time (for example, recipients of scholarships with restricting qualifications), these exceptions may be made only for students who meet at least the minimum admission and entrance requirements.

6. To assure a proper educational mix of students and to further broaden the educational opportunities offered by the University, the University Faculty Senate and the University administration may from time to time authorize various specialized programs. These programs may permit students who do not meet the basic qualifications for admission to degree candidacy to be admitted to such candidacy. These programs may also permit, in selected situations, exceptional students who have not earned a high school diploma or its equivalent to enroll in university credit courses. Such specialized programs may include up to 10 percent of the total admission group for the University in any one year and up to a maximum of 15 percent of the admission to any geographic location of the University.

7. Within this general policy, colleges of the University, with the concurrence of the University Faculty Senate, may impose certain educational background requirements (Carnegie Units) which must be completed by an individual before being admitted to degree candidacy.

**ADMISSION REQUIREMENTS—*Freshman Admission*** — A person who holds a high school diploma or its equivalent, and who has not taken credit courses at an institution of higher learning, or a person who holds a high school diploma or its equivalent and who has taken less than 18 semester credits at an accredited college or university may be considered for admission as a freshman.

Applicants for admission to all associate degree programs must submit scores of the Scholastic Aptitude Test of the College Entrance Examination Board.

All applications should be addressed to the Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802. Telephone: (814) 865-5471.

An applicant must state in writing whether he has attended any other institution of higher learning, even though advanced standing is not desired. Failure to indicate, at the time of registration, previous registration in another institution invalidates the admission.

To be admitted to degree candidacy, the applicant must have completed certain education background requirements, called Carnegie Units or secondary school units. To determine whether you have the appropriate secondary school units required for your choice of a program of study, refer to the following page to the program of your choice then read across to determine the necessary units.

# TWO-YEAR ASSOCIATE DEGREE MAJORS

## SECONDARY SCHOOL UNITS REQUIRED FOR ADMISSION TO ASSOCIATE DEGREE PROGRAMS

	English	Math. (A)*	Math. (B)+	Math. (C)**	Science	Other Subjects	Total
Aerospace Engineering Technology	3	2				10	15
Agricultural Business	3					12	15
Air Pollution Control Engineering Technology	3	2				10	15
Architectural Engineering Technology	3	2				10	15
Biomedical Equipment Technology	3	2				10	15
Business Administration	3		2			10	15
Chemical Engineering Technology	3	2				10	15
Community Services (Administration of Justice)	3					12	15
Computer Science	3	2				10	15
Electrical Engineering Technology	3	2				10	15
Forest Technology	3		2			10	15
Highway Engineering Technology	3	2				10	15
Hotel and Food Service	3					12	15
Labor Studies	3					12	15
Letters, Arts, and Sciences	3					12	15
Mass Communications – Broadcasting	3					12	15
Mass Communications – Journalism	3					12	15
Mechanical Engineering Technology (Drafting and Design Technology)	3	2				10	15
Medical Laboratory Technology	3	2				10	15
Mining Technology	3	2				10	15
Nuclear Engineering Technology	3	2				10	15
Nursing (2-year at Behrend College)	3			2	2	8	15
Recreation and Parks	3					12	15
Retailing	3					12	15
Sociology (2-year)	3					12	15
Steel Technology	3	2				10	15
Surveying Technology	3	2				10	15
Wildlife Technology	3		2			10	15

\*Math. (A) requirements may be satisfied by either 2 units of algebra or 1 unit of algebra and 1 of plane geometry.

+ Math. (B) requirements may be satisfied by any 2 units of mathematics, but it is strongly recommended that the 2 units be 1 of algebra and 1 of plane geometry.

\*\*Math. (C) requirements may be satisfied by 1 unit of algebra and 1 additional unit in mathematics.



## GENERAL INFORMATION

*Admission with Advanced Standing* — A person who has acquired at least 18 semester credits at an accredited college or university may be considered for admission with advanced standing.

The requirements for admission for such a student are the same as for a beginning freshman student as far as his secondary school record is concerned. In all cases where work has been taken at other institutions, an official transcript from each place of attendance must be submitted directly to the Admissions Office by the institutions attended. The latter must include evidence that the student was honorably dismissed and was in good academic standing at the time of leaving.

Associate degree programs have a limit on the number of credits that may be accepted by transfer from accredited institutions. Information on credit limitations may be obtained from the academic official responsible for a particular program. Grades are not transferred with credits from other institutions and do not, therefore, enter the calculation of the term or cumulative average at this university.

*Provisional Student (Degree Seeking)* — An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admission as a degree candidate may enroll in credit courses at the University. A provisional student must apply to enroll in courses every term. (After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a provisional student can be used to fulfill the degree requirements.) A provisional student may enroll in credit courses if the following criteria are met:

1. The student is making satisfactory progress towards admission as a degree candidate. Progress is satisfactory if a student has earned 18 credits with a minimum grade-point average of 2.00 (on a 4.00 scale). If a student has earned less than 2.00, the student is given a warning. A student who has earned 27 credits with a grade-point average of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent term.
2. There is space available after degree candidates have been accommodated.
3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons may petition for an exception to the policy.

Note: An applicant holding a baccalaureate degree or higher is not eligible to enroll as a provisional student. The applicant is referred to the graduate nondegree program.

*Nondegree Student* — An applicant holding a high school diploma or its equivalent may be permitted to enroll in credit courses (either for credit or audit) at the University. A person dropped as a degree candidate from the University for poor scholarship may take courses as a nondegree student to improve a grade-point average in order to apply for reinstatement as a degree candidate at the University.

A nondegree student may apply to enroll in courses each term if the following criteria are met:

1. The applicant has completed the prerequisites for the courses to be taken or can present evidence of ability to follow successfully the courses to be taken.
2. The grade-point average for all courses taken as a nondegree student at this university must be above the minimum average as specified by senate policy. However, an applicant previously dropped from degree candidacy for poor scholarship from this or any other college or university must maintain at least a 2.00 grade-point average as a nondegree student.
3. There is space available after degree candidates and provisional students have been accommodated.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. However, a person who has been dismissed or suspended from another college or university for disciplinary reasons may petition for an exception to the policy.



## TWO-YEAR ASSOCIATE DEGREE MAJORS

**Note:** Provisional students (degree seeking) and nondegree students are subject to the same tuition charges as regular students. The Academic Policies and Procedures approved by the University Faculty Senate apply to provisional and nondegree students as stated.

An individual desiring to take associate degree courses as a provisional student (degree seeking) or nondegree student should submit the appropriate application for admission. An application form may be obtained from the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802, or from the office of the director of any Commonwealth Campus of The Pennsylvania State University.

**DIVISION OF UNDERGRADUATE STUDIES**—This division is an academic unit which offers the following programs and services:

*Freshman Testing, Counseling, and Advising* for all new freshmen. Results of comprehensive testing are used in individual academic counseling to help evaluate each student's educational objectives and to plan course schedules for the first term.

*Enrollment and Registration.* Students whose interests or career objectives change can request that they be enrolled in 2-DUS (Division of Undergraduate Studies). Specialized academic advising in DUS accompanies students' attendance in regular courses until students choose a new program and meet its academic standards for transfer.

*Academic Advising and Counseling* are available to all students, including provisional students who will eventually seek admission to a degree-granting program.

*Undergraduate Academic Information* is coordinated and disseminated through DUS to assist with and promote understanding of students' academic advising needs.

**GRADING SYSTEM**—Grades shall be reported by the following symbols: A, B, C, D, and F.

<i>Grade</i>	<i>Quality of Performance</i>	<i>Grade-Point Equivalent</i>
A	Excellent	4
B	Good	3
C	Satisfactory	2
D	Poor	1
F	Failure	0

**GRADUATION REQUIREMENTS**—In order to be graduated, a student must complete the course requirements of his major and earn at least a C average (a grade-point average of 2.00) for all courses.

**DEGREES**—The associate degree majors outlined in this catalog lead to the following degrees: Associate in Agricultural Business, Associate in Business Administration, Associate in Community Services, Associate in Computer Science, Associate in Engineering, Associate in Forest Technology, Associate in Hotel and Food Service, Associate in Labor Studies, Associate in Letters, Arts, and Sciences, Associate in Mass Communications—Broadcasting, Associate in Mass Communications—Journalism, Associate in Medical Laboratory Technology, Associate in Mining Technology, Associate in Nursing, Associate in Recreation and Parks, Associate in Retailing, Associate in Sociology, Associate in Steel Technology, and Associate in Wildlife Technology.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE CAPITOL CAMPUS**—In addition to receiving an education preparing him for employment, the graduate of an associate degree program may also qualify for admission to various programs leading to a baccalaureate degree from Penn State's Capitol Campus. Those anticipating admission to Capitol Campus should inquire at the

## GENERAL INFORMATION

Capitol Campus Admissions Office late in their freshman year or early in their sophomore year concerning baccalaureate program course requirements.

The following associate programs, with electives in English composition, college algebra, and statistics, are acceptable toward the baccalaureate degree in Business Administration offered at Capitol Campus: Agricultural Business, Business Administration, Computer Science, Hotel and Food Service, Manufacturing Technology, Medical Laboratory Technology, Nursing, Retailing, and Steel Technology.

Graduates of the associate programs of Air Pollution Control Engineering Technology, Architectural Engineering Technology, Biomedical Equipment Technology, Chemical Engineering Technology, Electrical Engineering Technology, Highway Engineering Technology, Mechanical Engineering Technology, and Surveying Technology may wish to consider continuing at the Capitol Campus in a program of study in engineering technology leading to a Bachelor of Technology degree.

The following associate degrees are also acceptable toward admission to programs leading to a baccalaureate degree at Capitol Campus: Letters, Arts, and Sciences; Mass Communications–Broadcasting; Mass Communications–Journalism; and Sociology.

## STUDENT WELFARE

**ORIENTATION PROGRAM**—At the opening of the fall term all new students participate in an Orientation program. In addition to becoming acquainted with the new environment in which they will live and study, students receive instruction and counseling concerning their courses of study, participation in extracurricular activities, and the cultural opportunities open to them. Registration is also held during this period.

**STUDENT GOVERNMENT**—Representative student leadership is provided on each campus of the University by a student government association, which functions through officers and representatives elected from and by the student body. In addition to their involvement in student programs at their local campuses, student officers and delegates from University campuses convene several times annually. These meetings provide for an exchange of information among the various student government associations and for system-wide coordination in student government and student activities.

**STUDENT CONDUCT**—The University regards as serious offenses all acts of unethical, immoral, dishonest, or destructive behavior, as well as violations of University regulations as set forth in each campus's student handbook and in the *Policies and Rules for Students*, a copy of which is available to each student upon registration.

**INSURANCE PROTECTION WHILE ATTENDING THE UNIVERSITY**—The Pennsylvania State University is an instrumentality of the Commonwealth performing its function of education. It is not liable for the negligence of its officers, servants, and employees when in the exercise of public or governmental powers or in the performance of public or governmental duties incident to the general educational work of the University.

Therefore any student who desires insurance protection while in attendance at the University (1) against personal injury and/or (2) against loss of property by fire or theft should arrange personally for whatever insurance seems advisable.

**HEALTH SERVICES**—The University Health Service assists in maintaining and promoting the health of students.

Every new full-time student must successfully complete a physical examination before being permitted to register for classes at the University.

The health services of the University are made available to students in accordance with a statement provided by each campus, pertinent to that campus, and published in its student handbook.

The University does not obligate itself for payment of medical services other than those provided by personnel employed or retained by the University and in facilities owned or contracted for by the University. Treatment provided in contract facilities must be authorized by the campus director, dean of student affairs, or nurse.

Students are urged to protect themselves against medical expenses that may result from injury or illness by arranging for personal insurance coverage.

**CAREER DEVELOPMENT AND PLACEMENT**—The Career Development and Placement Center assists students in continual evaluation of their educational and career plans as they progress through college and helps them identify sources of personal or academic difficulty which may interfere with their progress.

A Student Affairs staff member at each campus has responsibility for providing placement assistance for associate degree graduates. Services include bringing employers to the campus to interview graduates for permanent employment, providing job information, and assisting students in preparing for job interviewing. The Career Development and Placement Center at the University Park Campus supplies prospective employers (national, state, and local) with information concerning the associate degree programs and works cooperatively with the Commonwealth Campuses in assisting graduates to locate suitable employment.

## STUDENT AID

Each application for admission packet contains *Information for Seeking Financial Assistance*. Each applicant should follow the instructions received in the packet and should retain them for future reference.

Additional information about scholarships, grants, loans, awards, and student employment may be obtained from the Office of Student Aid, 135 Boucke Building, on the University Park Campus, or from the Office of Student Affairs at a Commonwealth Campus.

**INSTRUCTIONS FOR ENTERING FRESHMAN CANDIDATES**—Entering freshman candidates who desire to be considered for institutional aid (scholarships and loans) or federal aid (Supplemental Educational Opportunity Grants, National Direct Student Loans, or the Federal College Work-Study Program) must complete the requirements for admission to the University, and their parents must complete the required Parents' Confidential Financial Statement. A limited number of freshman scholarships are awarded to some students who have outstanding high school records, high College Entrance Examination Board test scores, and a verifiable financial need. Supplemental Educational Opportunity Grants are awarded in combination with National Direct Student Loans, or other forms of aid, to needy students. The Office of Student Aid and the Office of Admissions jointly seek out capable disadvantaged students from urban and rural areas to receive these grants.

A. Steps to be completed—Qualified candidates who desire consideration for scholarships, grants, or loans should complete the following steps.

1. Apply for admission to the University.
2. Have their parents complete a Parents' Confidential Financial Statement during their senior year but prior to November 1, and forward it to the College Scholarship Service, Box 176, Princeton, NJ 08540, for analysis. (Forms may be obtained from high school guidance counselors.) Completed statements must be accompanied by an initial fee payable to the College Scholarship Service, with an additional fee for each transcript beyond the first.



## GENERAL INFORMATION

No action will be taken on requests for financial aid consideration for those candidates who do not complete both of the foregoing steps.

B. Freshman candidates are also expected to apply for a Basic Educational Opportunity Grant and a Pennsylvania Higher Education Assistance Agency Grant.

1. Basic Educational Opportunity Grant. This is a federal entitlement obtained from the federal government. Applications are available from your high school guidance counselor.
2. Pennsylvania Higher Education Assistance Agency Grant. This is a state grant for Pennsylvania residents. Applications are available from your high school counselor or from the Pennsylvania Higher Education Assistance Agency in Harrisburg.

The philosophy of the Office of Student Aid is that University aid is supplemental to these two programs. When University awards are made, it is assumed and also expected that needy students will exert the necessary effort to obtain these resources.

**NO SEPARATE FINANCIAL AID APPLICATION**—Entering freshman candidates seeking financial aid consideration from University resources are expected to complete only the foregoing steps—they should not request a financial aid application from the University.

**NOTIFICATION OF AWARD**—Most scholarship, grant, and loan award letters are mailed by the Office of Student Aid and the various University Scholarship Committees during the period between February 1 and July 15 (depending on federal funding). These awards are made, within the limits of total funds available, to students (1) whose credentials are complete and (2) who are most clearly eligible to receive them according to the appraisal of the selection committees. All students who cannot be helped from University funds will be informed of this fact.

**CONSIDERATION FOR AID CONTINGENT UPON ADMISSION**—All requests for financial aid are cancelled automatically for those students who do not receive an offer of admission to the University.

**GUARANTEED STUDENT LOANS**—Students who do not receive financial aid award letters from the University from the period February through July are advised to seek student loans through their respective state guaranteed loan agencies. Applications for these loans are obtained from the loan officer of the student's hometown bank.

**STUDENT PART-TIME EMPLOYMENT**—Regular part-time jobs and odd jobs are available on most of the Penn State campuses and in the communities within which these campuses are located. Freshmen may qualify for part-time work, but they should make certain that they have allowed sufficient time for study.

**COLLEGE WORK-STUDY JOBS**—This program was initiated by the federal government to stimulate and promote the part-time employment of undergraduate and graduate students in need of such earnings to pursue their courses of study. These jobs are arranged through the Office of Student Aid and the deans of student affairs at Commonwealth Campuses. A Parents' Confidential Financial Statement is necessary for consideration.

**WINTER, SPRING, AND SUMMER TERM ADMISSIONS**—All scholarships and grants, and most student loans awarded by the University, are awarded on an annual basis beginning with the fall term. Additional funds are generally available on a limited basis for students entering in the winter, spring, or summer terms. Students who desire to borrow through their state guaranteed loan programs should obtain loan applications from their respective hometown banks.

## TUITION AND OTHER CHARGES

**ATTENTION**—Completion of the steps outlined on the preceding page fulfills the requirements for seeking financial aid consideration from the University only. Students who desire to qualify for a state grant, Basic Educational Opportunity Grant, or state-guaranteed loan must follow a different set of procedures. Students should contact their high school guidance counselor or the Higher Education Assistance Agency of their respective home states for directions regarding financial aid from non-University sources. For Pennsylvania residents, the agency is the Pennsylvania Higher Education Assistance Agency, Towne House, Harrisburg, PA 17102.

## TUITION AND OTHER CHARGES

*NOTE: The University reserves the right to revise tuition and charges without further notice. Tuition and charges for baccalaureate and graduate programs are listed separately in the Baccalaureate Degree Programs, Graduate Degree Programs, and Capitol Campus catalogs. Penn State has four ten-week terms each year. Students normally attend three terms per year.*

*It is difficult to estimate the total cost of a year at the Penn State Commonwealth Campuses and Behrend College since it varies with the style of living and courses taken. A moderate student budget for three terms, including tuition, room and board charges, books and supplies, travel, clothing and laundry, personal maintenance, and medical and recreation costs, is estimated at \$3,540 for Pennsylvania residents living in University housing or off-campus housing. Students living at home would have somewhat lower costs. Specific information outlining the breakdown for these various charges is available on request through the Office of Student Aid, 135 Boucke Building, University Park, PA 16802.*

**TUITION**—Tuition per term for associate degree students:

	<i>Pennsylvanians</i>	<i>Non-Pennsylvanians</i>
8 or more credits:		
University Park Campus	\$383	\$801
Other Commonwealth Campuses	352	801
7 or fewer credits:		
University Park Campus—rate per credit	48	100
Other Commonwealth Campuses— rate per credit	38	100

**Enrollment Charge**—All entering students who plan to enroll for 8 or more credits are required to pay a nonrefundable enrollment charge of \$50 upon acceptance of an offer of admission.

**General Deposit**—All full-time undergraduate students are required to make a general deposit of \$50 at the time of admission. This deposit will serve to safeguard the property and equipment used by students in their course of study. It will be retained until a student withdraws or is graduated.

The deposit, less any charges for equipment damages, losses, and forfeitures, will be refunded early in the subsequent term to the student who has withdrawn or been graduated. The refund will be made by check and mailed to the student's home address. If at any time the balance of the deposit falls below the minimum amount of \$15, the deposit must be replenished.

**Credit by Examination**—A charge of \$15 per credit is made for credit by examination. For evaluation of credits completed elsewhere a charge of \$10 is made for those applying for admission and a charge of \$1 for those who are already matriculated.

**Student Activities**—Student activities charges are determined by elected representatives of the student body, together with a faculty representative.

## GENERAL INFORMATION

*Change of Schedule Charge*—Unless a change is necessitated by the University, a charge of \$2 is made for each change of schedule.

*Late Registration Charge*—Unless the delay is unavoidable, \$10 is charged a student who fails to register on the appointed day.

*Other Expenses*—Books and supplies must be secured by the student. These vary from approximately \$60 per term, depending upon the program.

**TERMS OF PAYMENT**—Tuition and charges, including room and board, are due and payable in advance of each term at the Office of the Bursar, 103 Shields Building, University Park, PA 16802. Registration for courses may not be completed until tuition and charges are paid.

Approximately six weeks in advance of each term, the University will mail to each continuing and newly admitted student of record an estimated bill for tuition and, where applicable, residence hall charges. Payment by mail is encouraged before the established deadline. The receipt is returned to the student by mail and will permit registration for the designated number of credits. This receipt is likewise authorization to obtain, where applicable, the residence hall key and meal ticket. If checks tendered for payment of tuition and charges are not paid upon presentation to the maker's bank, the student will automatically incur the late payment fee of \$25, and the receipt previously mailed will be considered null and void.

Any student who does not fulfill payment of obligations by the deadline established may be charged the late payment fee of \$25. This charge for late payment also applies to unpaid student supplemental charges. Students whose accounts are delinquent for more than ten days are subject to suspension from the University.

**WITHDRAWALS AND REFUNDS**—In the event of withdrawal, charges for tuition will be refunded under the following policy:

Refund of 80 percent upon withdrawal before the end of the first week of the term (seventh consecutive calendar day from the first day of classes) and a decrease of 20 percent for each week thereafter up to and including the fourth consecutive calendar week. No amount will be refunded for withdrawal after the fourth consecutive calendar week of the term.

Under this policy if a student is enrolled for 8 or fewer credits and drops 1 or more credits, refunds will be determined in accordance with the above policy.

Any refund policy related to adjustments in room and board will be a part of the housing contract.



# MAJORS

## GENERAL DEGREE REQUIREMENTS

There are a number of areas in which a certain level of competence is expected of all recipients of associate degrees. Therefore, all associate degree programs of the University demand the satisfactory completion of the following requirements:

- 3 credits in the social sciences
- 3 credits in the arts and humanities
- 3 credits in English
- 3 credits in speech communication
- 6 credits in the physical sciences, biological science, or mathematics
- 3 credits in general education electives\*

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\*If the student has not had courses in all three areas of physical science, biological science, and mathematics either in high school or in his associate degree program, these three "general education" credits must be used to remedy this deficiency. Otherwise, they may be in any of the areas listed above.

**RESERVATIONS**—The University reserves the right to make such program or class changes as may become necessary because of insufficient enrollment or other contingencies. The University also reserves the right to make any necessary changes in tuition and charges without prior notice. Courses and programs described and listed in this catalog are also subject to change without notice.

ASSOCIATE DEGREE MAJORS

AEROSPACE ENGINEERING TECHNOLOGY

This major prepares students for careers as supportive personnel in the aerospace field. Graduates will work as designers and laboratory technicians in the areas of aircraft and missile structures, aerodynamics, and propulsion.

FIRST TERM	Credits	SECOND TERM	Credits
Cmp.Sc. 1, Basic Computer Programming	1	E.G. 12, Spatial Analysis	2
E.G. 1, Engineering Drawing	2	*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		
	10		11
THIRD TERM	Credits		
Aersp. 800, Applied Aerodynamics	3		
E.Mch. 811, Elementary Mechanics	3		
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3		
Math. 803, Technical Calculus	3		
	12		
+SUMMER TERM	Credits		
Aersp. 806, Computer Applications to Aerospace Engineering	3		
Aersp. 809, Aerospace Laboratory	3		
	6		
		FOURTH TERM	Credits
		Aersp. 803, Technical Aerodynamics	3
		E.E. 800, Applied Electricity	2
		E.Mch. 813, Strength and Properties of Materials	3
		I.E. 811, Manufacturing Materials and Processes	3
			11
FIFTH TERM	Credits	SIXTH TERM	Credits
Aersp. 802, Aircraft Structural Analysis	3	Aersp. 807, Aircraft Structural Design	3
Aersp. 804, Aircraft Propulsion	3	Sp.Com. 200, Effective Speech	3
Aersp. 808, Electronic Instrumentation	3	Humanities selection	3
Social science selection	3	Technical selection	3
	12		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 also, but may take an elective.  
+Summer term to be taken at the University Park Campus.

# AGRICULTURAL BUSINESS

This major prepares students for service in commercial farming and businesses which serve agriculture. The latter includes businesses which process and market farm products, as well as those which provide farmers with all kinds of production supplies, such as feeds, fertilizers, chemicals, biological products, and machinery. Training is also provided in agricultural business organization, management, and sales. This basic program is supported with courses in crop and livestock production and in agricultural engineering.

To be eligible to receive the associate degree, a student must have completed the prescribed major of 62 credits. The first three terms are offered at selected Commonwealth Campuses. The last three terms are offered at the University Park Campus.

FIRST TERM		SECOND TERM	
Acctg. 801, Introductory Accounting	Credits 3	Biological science selection	Credits 3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	B.Law 843, Introduction to Business Law	3
Social science selection	3	Engl. 10, Composition and Rhetoric II; or selection	3
	—	Sp.Com. 200, Effective Speech	3
	9		12
THIRD TERM		FOURTH TERM	
Chem. 11, Introductory Chemistry	Credits 3	Ag.E. 800, Farm Power	Credits 2
Humanities selection	3	Ag.E. 801, Farm Structures and Utilities	3
Elective	3	Ag.Ec. 801, Management of Commercial Farms	3
	—	Ag.Ec. 803, Introduction to Agricultural Business	3
	+9		11
FIFTH TERM		SIXTH TERM	
Ag.Ec. 802, Agricultural Marketing and Sales	Credits 3	Ag.Ec. 800, The Agricultural Economy	Credits 3
An.Sc. 800, Livestock Production	2	Plt.Sc. 800, Field and Forage Crop Production	3
An.Sc. 801, Poultry Production	2	Plt.Sc. 801, Production of Horticultural Crops	3
An.Sc. 802, Dairy Production	2	Plt.Sc. 802, Use of Agricultural Chemicals	3
	—		12
	+9		

\*Students will be placed in Engl. 4 or Engl. 10 on the basis of English Placement Test scores.

+A student may schedule up to 12 credits in these terms. If additional credits are scheduled, suggested courses are mathematics, economics, business management, or biological science.

## ASSOCIATE DEGREE MAJORS

### AIR POLLUTION CONTROL ENGINEERING TECHNOLOGY

This major prepares graduates as air pollution control technicians, working for a local, state, or federal agency. Technicians may be responsible for the calibration, installation, and operation of air sampling and monitoring equipment, investigation of complaints, plant inspections, source evaluation, and may be expected to make suitable recommendations based on their findings. As an industrial air pollution control technician, these same responsibilities may be required with the addition of evaluation and monitoring of gas cleaning equipment performance.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3-4
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Cmp.Sc. 1, Basic Computer Programming	1
Engr. 2, Engineering Orientation	1	E.E. 801, Fundamentals of D.C. Circuits	3
Math. 801, Technical Mathematics	3	E.E. 809, D.C. Circuits Laboratory	2
—	—	Math. 802, Technical Mathematics	3
	12	—	—
			13-14
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Chem. 13, Chemical Principles	3	E.E. 810, Fundamentals of Semiconductors	3
Chem. 15, Experimental Chemistry	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
E.E. 814, Electrical Circuits	4	Phys. 150, Technical Physics	3
E.E. 818, Electrical Circuits Laboratory	1	Humanities selection	3
Math. 803, Technical Calculus	3	—	—
—	—		12
	12		
FIFTH TERM	<i>Credits</i>	+SIXTH TERM	<i>Credits</i>
Ch.E. 830, Industrial Chemistry	3	M.E. 882, Air Resource Management	3
E.Mch. 810, Basic Mechanics	2	M.E. 883, Air Pollution Analysis Instrumentation	3
M.E. 881, Elementary Thermo and Fluid Dynamics	2	M.E. 884, Sampling and Monitoring Program	2
Sp.Com. 200, Effective Speech	3	Meteo. 303, Introductory Meteorology	3
Social science selection	3	—	—
—	—		11
	13		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826, but may take an elective.

+Sixth term to be taken at the University Park Campus.

# ARCHITECTURAL ENGINEERING TECHNOLOGY

This two-year program is designed to provide technically trained personnel between the level of high school graduate and professional architectural engineer or architect to support the architectural design and construction industries. Architectural engineering technicians work under the supervision of a graduate architect or architectural engineer. They translate sketches and design concepts into working drawings and renderings. To do so, they need basic skills in structural and environmental systems design and layout, knowledge of building materials and equipment characteristics and performance, as well as the training in drafting techniques required for the realization of final drawings.

The graduates of this major are prepared for employment in architectural, building engineering, or industrialized housing firms.

FIRST TERM		SECOND TERM	
E.G. 3, Architectural Graphics	Credits 2	A.E. 801, Building Materials	Credits 2
*Engl. 4, Basic Writing Skills; or		E.Mch. 811, Elementary Mechanics	3
Engl. 10, Composition and		Math. 802, Technical Mathematics	3
Rhetoric I	3	Phys. 151, Technical Physics	3
Engr. 2, Engineering Orientation	1		—
Math. 801, Technical Mathematics	3		11
Phys. 150, Technical Physics	3		
	—		
	12		
THIRD TERM			
A.E. 802, Methods of Construction I	Credits 3		
A.E. 803, Plumbing, Fire Protection			
and Electrical Layout	3		
*Engl. 10, Composition and Rhetoric I; or			
Engl. 20, Composition and			
Rhetoric II	3		
Math. 803, Technical Calculus	3		
	—		
	12		
+SUMMER TERM			
A.E. 812, Building Lighting	Credits		
and Acoustics	3		
		FOURTH TERM	Credits
		A.E. 805, Architectural Rendering	2
		A.E. 808, Graphic Analysis	2
		E.E. 800, Applied Electricity	2
		E.Mch. 813, Strength and Properties	
		of Materials	3
		Social science selection	3
			—
			12
FIFTH TERM		SIXTH TERM	
A.E. 804, Heating, Ventilating and	Credits	A.E. 807, Methods of Construction II	Credits 2
Air Conditioning Layout	3	A.E. 810, Architectural Engineering	
A.E. 809, Structure Design	3	Office Practice	2
Sp.Com. 200, Effective Speech	3	Cmp.Sc. 1, Basic Computer Programming	1
Humanities selection	3	I.E. 315, Industrial Organization and	
	—	Administration	3
	12	Technical selection	2-3
			—
			10-11

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 also, but may take an elective.

+Summer term to be taken at the University Park Campus.



## ASSOCIATE DEGREE MAJORS

### BIOMEDICAL EQUIPMENT TECHNOLOGY

This major prepares students for careers as biomedical equipment technicians, men and women responsible for specifying, calibrating, maintaining, and replacing clinical electronic equipment used in patient care. Modern health care facilities now have complex electronic instrumentation and apparatus located in virtually every diagnostic and patient treatment area. While these innovations result in improved patient care, they also require extensive maintenance procedures, new equipment calibration, complex servicing and repair, as well as attention to patient and operator safety. A total of 74-75 credits are required for graduation.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or		E.E. 809, D.C. Circuits Laboratory	2
Engl. 10, Composition and Rhetoric I	3	Math. 802, Technical Mathematics	3
Engr. 5, Experimental Methods for		Phys. 151, Technical Physics	3
Engineers; or if not available,			—
Engr. 2, Engineering Orientation	1		11
Math. 801, Technical Mathematics	3		
Phys. 150, Technical Physics	3		
	—		
	12		
THIRD TERM	Credits	FOURTH TERM	Credits
Cmp.Sc. 1, Basic Computer		Biol. 41, Physiology	3
Programming	1	Chem. 11, Introductory Chemistry	3
E.E. 814, Electrical Circuits	4	E.E. 807, A.C. and Electronics	
E.E. 818, Electrical Circuits Laboratory	1	Laboratory	2
*Engl. 10, Composition and Rhetoric I; or		E.E. 810, Fundamentals of Semiconductors	3
Engl. 20, Composition and Rhetoric II;			—
or Engl. 826, Report Writing	3		11
Math. 803, Technical Calculus	3		
	—		
	12		
FIFTH TERM	Credits	SIXTH TERM	Credits
B.E.T. 801, Physiological Transducers	3	B.E.T. 802, Biomedical Instrumentation	
Chem. 12, Chemical Principles	3-4	and Systems	3
E.E. 816, Linear Electronic Circuits	3	M.E. 881, Elementary Thermo and	
E.E. 821, Linear Electronics		Fluid Dynamics	2
Laboratory	1	Sp.Com. 200, Effective Speech	3
Social science selection	3	Humanities selection	3
	—		—
	13-14		11
SEVENTH TERM (SUMMER)	Credits		
B.E.T. 803, Biomedical Equipment			
Laboratory (Internship)	4		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10.



BUSINESS ADMINISTRATION

This two-year, college-level academic program is designed to provide instruction in business administration that fulfills the requirements of various levels of responsibility higher than that held by high school graduates.

The primary objective of this major is to provide a managerially oriented program with sufficient communicative and mathematical skills, socially relevant course work, and advanced courses in specific business specialities to develop a well-rounded graduate.

I. General Education Requirements (23 credits)	Credits
A. Communication skills	12
*Engl. 4, 10, 826; Sp.Com. 200	
B. Social sciences, humanities	9
History, humanities, political science, psychology, sociology selection	
C. Physical education	2
II. Requirements for the Major (45 credits)	
A. General	30
Econ. 2 or 4; Computer Science; Math. 800 or 17; Acctg. 801, 802; B.Law 843; Fin. 807; Mgmt. 800; Mktg. 800; Q.B.A. 101	
B. Specialization	15
Students will select five courses from the following list according to their area of specialization: Acctg. 803, 806, 807; B.A. 803; B.Law 850; B.Log. 102, 104, 206; Fin. 108, 210; Ins. 800, 810, 820, 830; I.B. 862; Mktg. 801, 802, 804, 805, 806; Mgmt. 801, 802; R.Est. 800, 810, 830; Q.B.A. 102	

\*Students will be placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students not required to take Engl. 4 will take Engl. 20.

## ASSOCIATE DEGREE MAJORS

### CHEMICAL ENGINEERING TECHNOLOGY

This major prepares graduates for positions as assistants to chemists and chemical engineers, assistants in research and control laboratories, and trainees for future supervisory positions in manufacturing and production.

It provides the training necessary for such positions, including a reasonable proficiency in basic sciences, mathematics, communication skills, and the basic principles of chemical engineering technology.

FIRST TERM	Credits	SECOND TERM	Credits
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3-4
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Cmp.Sc. 1, Basic Computer Programming	1
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	—		—
	12		11-12
THIRD TERM	Credits	FOURTH TERM	Credits
Ch.E. 830, Industrial Chemistry	3	Ch.E. 800, Technical Calculations	3
Chem. 13, Chemical Principles	3	Chem. 23, Introduction to Modern Analytical Chemistry	4
Chem. 15, Experimental Chemistry	1	Phys. 150, Technical Physics	3
Math. 803, Technical Calculus	3	Humanities selection	3
Sp.Com. 200, Effective Speech	3		—
	—		13
	13		
FIFTH TERM	Credits	SIXTH TERM	Credits
Ch.E. 802, Chemical Technology	3	Ch.E. 803, Chemical Technology	3
Chem. 34, Organic Chemistry	3	Ch.E. 820, Chemical Technology Laboratory	4
Phys. 151, Technical Physics	3	Technical selection	3
Social science selection	3		—
	—		10
	12		

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\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826, but may take an elective.

COMMUNITY SERVICES

The Community Services major is designed to provide entry-level professional competency in one of several human service fields. The objective of the Administration of Justice emphasis is to provide a general education background, a knowledge base in human development, and a core of professional skills.

The Administration of Justice emphasis educates and upgrades career personnel in police departments, probation and parole agencies, and correctional institutions. Challenges and problems in law enforcement, current approaches and alternatives for crime control, prevention, and rehabilitation are studied. The program includes one term of field experience in a local community agency.

*The Administration of Justice Emphasis*

I. General Education Requirements (21 credits)	<i>Credits</i>
A. Communication skills	
Engl. 10, 20; Sp.Com. 200	9
B. Biological and physical sciences	
A minimum of 3 credits in each area	6
C. Arts and humanities	3
D. Social and behavioral sciences	3
II. Requirements for the Major (41 credits)	
A. General requirements	
Com.D. 7, H.Dev. 100, I.F.S. 129	7
B. Requirements for Administration of Justice emphasis	34
H.Dev. 321 (12)*, or L.E.C. 321 (8) plus 4 additional credits of approved professional electives; L.E.C. 111 and 221, plus 16 credits of professional electives with consent of adviser.	

\*Guidelines for Field Placement include:

1. Agencies utilized are local agencies.
2. Priority for placement is made for students with higher term standings.
3. Prerequisites for placement include Com.D. 7 and L.E.C. 111.

ASSOCIATE DEGREE MAJORS

COMPUTER SCIENCE

The primary objective of this program is to prepare graduates for immediate and continuing employability as application programmers, associate systems designers, or associate systems programmers.

To meet this objective the program is designed to ensure a thorough knowledge of the techniques of programming general-purpose digital computers, and includes extensive practice — using contemporary programming technologies — in the analysis, organization, validation, and documentation of effective computer code. The program also includes practical knowledge of the logical organization of modern digital computers and related peripheral equipment, the structure of operation systems and compilers, and considerations in the design of information systems.

The General Education Requirements provide the student with an extension to his basic educational foundation. The General Requirements for the Major give the graduate technical competence in the computing and data processing field. The Application Specialization provides a practical knowledge of a minor or an application field within which the graduate may profitably utilize the acquired computing talent.

		<i>Scheduling Recommendation by Term Standing</i>	
		1-3	4-6
I.	General Education Requirements (29 credits)		
A.	Communication skills (9 credits)		
	English selection (6)	x	—
	Sp.Com. 200 (3)	—	x
B.	Mathematics and statistics (12 credits)		
	Math. 17 (3), 18 (3)	x	—
	Mathematics selection (3)	x	—
	Quantitative business analysis or statistics selection (3)	—	x
C.	Social science, arts, humanities (6 credits)		
	Social science selection (3)	x	x
	Arts and humanities selection (3)	x	x
D.	Physical sciences (2 credits)		
	Physical education selection	x	—
II.	Requirements for the Major (22 credits)		
A.	General		
	Cmp.Sc. 101, 102, 140 (9)	x	—
	Cmp.Sc. 804 (1)	x	—
	Cmp.Sc. 44, 54, 64 (9)	—	x
	Cmp.Sc. 805 (3)	—	x
B.	Application Specialization (12 credits)		
	Related course work in an area of computer application — to be approved by the student's adviser. These courses may be chosen from areas such as accounting, retail operations, general business, mathematics, general science, environmental resources, etc., and are selected from the courses offered at the student's campus.	x	x

# ELECTRICAL ENGINEERING TECHNOLOGY

## ELECTRICAL ENGINEERING TECHNOLOGY

This major is designed to prepare graduates for technological service with electrical utilities, manufacturers of electrical and electronic equipment, and electrical maintenance and instrument departments of various industrial concerns. The principal objective is to provide a practical knowledge of electrical machinery and its control, as well as of electronic theory and its application in communication and control systems.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		—
	12		11
THIRD TERM			
	<i>Credits</i>		
Cmp.Sc. 1, Basic Computer Programming	1		
E.E. 814, Electrical Circuits	4		
E.E. 818, Electrical Circuits Laboratory	1		
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3		
Math. 803, Technical Calculus	3		
	12		
SUMMER TERM		FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
E.E. 813, Fundamentals of Electrical Machines	3	E.E. 804, A.C. Circuits	2
		E.E. 807, A.C. and Electronics Laboratory	2
		E.E. 810, Fundamentals of Semiconductors	3
		E.Mch. 810, Basic Mechanics	2
		Social science selection	3
			—
			12
FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
E.E. 815, A.C. Machinery and Control	4	E.E. 817, Advanced Electronics	4
E.E. 816, Linear Electronic Circuits	3	E.E. 820, Advanced Electronics Laboratory	2
E.E. 819, A.C. Machinery Laboratory	1	Humanities selection	3
E.E. 821, Linear Electronics Laboratory	1	Technical selection	2-3
Sp.Com. 200, Effective Speech	3		—
	12		11-12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826 also, but may take an elective.

ASSOCIATE DEGREE MAJORS

FOREST TECHNOLOGY

The objectives of this major are to train students in the techniques that are basic to planning, organizing, directing, and managing forestry enterprises and to provide a program of general studies which will serve as a foundation for future intellectual growth. It is intended that graduates will act in a supporting capacity to professional foresters.

To be eligible to receive the degree of Associate in Forest Technology, a student must have completed the prescribed major of 65 credits.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Engl. 10 Composition and Rhetoric I; or Engl. 4, Basic Writing Skills	3	For. 800, Introduction to Forestry	1
For. 800, Introduction to Forestry	1	For. 806, Forest Inventories	3
For. 802, Dendrology	3	For. 815, Forest Surveying I	3
For. 804, Forest Mensuration	3	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3		—
	—		10
	13		

THIRD TERM	<i>Credits</i>
For. 800, Introduction to Forestry	1
For. 808, Forest Protection	3
Humanities selection	3
Acctg. 16, Introductory Accounting Survey	3
For. 816, Forest Surveying II	3
	—
	13

SUMMER TERM	<i>Credits</i>
For. 813, Summer Field Practice	4

FOURTH TERM	<i>Credits</i>
Engl. 826, Report Writing	3
For. 807, Forest Recreation	3
For. 812, Elements of Project Supervision in Forestry	3
For. 814, Forestry Leadership Practicum	1
	—
	10

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
For. 811, Forest Photo Interpretation	4	For. 809, Forest Valuation	3
Sp.Com. 200, Effective Speech	3	For. 810, Forest Improvements	3
Social science selection	3	For. 817, Urban Forestry	3
	—		—
	10		9



## HIGHWAY ENGINEERING TECHNOLOGY

This major prepares highway construction technicians to perform many of the planning and design tasks necessary in the construction of highways, railroads, bridges, viaducts, and airfields. In the planning stages of construction a highway construction technician may be engaged in estimating costs, purchasing materials, preparing specifications, computing fills, cuts, drainage requirements, drafting, designing, or surveying. During actual construction, such technicians may perform supervisory functions and inspection.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	E.Mch. 810, Basic Mechanics	2
*Engl. 4, Basic Writing Skills; or		*Engl. 10, Composition and Rhetoric I; or	
Engl. 10, Composition and Rhetoric I	3	Engl. 20, Composition and Rhetoric II	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 150, Technical Physics	3
	<hr/>		<hr/>
	12		13
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
C.E. 812, Curves and Earthwork	3	C.E. 814, Photogrammetry	3
Cmp.Sc. 1, Basic Computer		C.E. 818, Route Surveying	2
Programming	1	Engl. 826, Report Writing	3
E.Mch. 813, Strength and Properties		G.Sc. 1, Physical Geology	3
of Materials	3		<hr/>
Math. 803, Technical Calculus	3		11
Phys. 151, Technical Physics	3		
	<hr/>		
	13		
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
C.E. 821, Concrete Technology	3	C.E. 824, Asphalt Technology	3
C.E. 822, Soil Mechanics	3	C.E. 825, Construction Estimating	3
C.E. 823, Highway Organization		Econ. 14, Principles of Economics	3
and Operations	3	Sp.Com. 200, Effective Speech	3
Human. 1, Values of the Western			<hr/>
Cultural Heritage	3		12
	<hr/>		
	12		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 also, but may taken an elective. Engl. 826 is required for all students in the program.

ASSOCIATE DEGREE MAJORS

HOTEL AND FOOD SERVICE

This is an intensive six-term major designed to prepare students for responsible executive positions in the hospitality industry and in health facilities food service administration. The course of study places heavy reliance on experience acquired in an on-the-job setting. Students who achieve outstanding records may, upon completing this program, apply for admission to the baccalaureate degree program in Food Service and Housing Administration in the College of Human Development. Nine additional terms of satisfactory work would be required to earn the baccalaureate degree.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	
6 credits in English, Sp.Com. 200	9
B. Arts, humanities, social and behavioral sciences	12
At least 3 credits in economics	
C. Physical education	2
II. Requirements for the Major	
A. General	15
F.S.H.A. 50, 225; H.F.S. 850, 860; 3 credits in accounting	
B. Specialization	30
Students may select an emphasis in Hospitality Administration or Health Facilities Food Service Administration.	
Students emphasizing Hospitality Administration will be required to take F.S.H.A. 102, H.F.S. 804 and 870, plus 20 additional credits with the approval of their adviser. Students emphasizing Health Facilities Food Service Administration will be required to take F.S.H.A. 103, H.F.S. 875, Nutr. 351 and 800, plus 16 additional credits with the approval of their adviser.	

LABOR STUDIES

The purpose of this program is to help employees improve their understanding and competence in coping with personal, group, and organizational problems at their worksites, in relationships with employers, and in transactions with the community, the economy, and the polity. The program consists of a core of labor courses supplemented by introductory liberal arts studies which provide (1) basic communication skills, (2) conceptual tools of analysis, and (3) a more general cultural context for the examination of labor problems.

This major leads to the degree of Associate in Labor Studies.

I. General Education Requirements (21 credits)	<i>Credits</i>
A. Communication skills	
English selection, speech communication selection	6
B. Humanities, natural, and social sciences	15
Biological science, humanities, mathematics, physical science, and social science selections	
II. Requirements for the Major	
A. General	
Econ. 14, Hist. 21, Pl.Sc. 1, Psy. 2, Soc.1	15
Management selection, speech selection	6
B. Labor Studies	18
L.S. 100*, 102, 103, 104, 156, 189	
	60

\*Will be accepted toward the baccalaureate major in Labor Studies.

**LETTERS, ARTS, AND SCIENCES\***

The objectives of this program are to broaden the student's understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student's interests or career plans. This program is a complete two-year degree program. However, graduates who later seek admission to baccalaureate programs may apply baccalaureate credits toward the new degree. Any 800-level credits taken in the Letters, Arts, and Sciences program are not applicable toward a baccalaureate degree.

This major leads to the degree of Associate in Letters, Arts, and Sciences.

	<i>Scheduling Recommendation by Term Standing</i>	
	1-3	4-6
I. Required Courses (36 credits)		
Communication skills (9 credits)		
+ Engl. 10 (3), Engl. 20 (3)	x	—
Sp.Com. 200 (3)	x	—
Arts (6 credits)		
**Select 6 credits in any courses designated as arts	x	x
Humanities (6 credits)		
**Select 6 credits in any courses designated as humanities	x	x
Social and behavioral sciences (6 credits)		
**Select 6 credits in any courses designated as social and behavioral sciences	x	x
Science (6 credits)		
**Select 6 credits in any courses designated physical, biological, or earth and space sciences	x	x
Mathematics (3 credits)		
**Select 3 credits in mathematics (Math. 4, 6, 10 <i>not</i> acceptable), statistics, computer science, or philosophy (Phil. 12, 212 <i>only</i> )	x	x
II. Related Courses (9 credits)		
**Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, science and mathematics	x	x
III. Electives (15 credits)	x	x

\*The 36 required credits must be baccalaureate-level courses. For those intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a Bachelor of Arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken.

+Students will be placed in Engl. 4, Engl. 10, or Engl. 30 on the basis of English Placement Test scores. If a student is placed in Engl. 30, successful completion of that course will satisfy the English requirement; in addition, 3 credits will be given for Engl. 10.

\*\*Courses which will satisfy the arts, humanities, social and behavioral sciences, and science and mathematics requirements are defined in the University-wide requirements for a Bachelor of Arts degree described in the *Baccalaureate Degree Programs* catalog. Please note that subject areas which are listed as acceptable under more than one category may be applied to *only one* category.

ASSOCIATE DEGREE MAJORS

MANUFACTURING ENGINEERING TECHNOLOGY

This major prepares graduates for employment by manufacturing enterprises in those activities which are associated with production management. The objective is to qualify students in basic engineering science, principles of methods analysis, motion study, time study, wage payment, production planning and control, and quality control.

The work of the first three terms will provide a basic knowledge of industrial processes and will enable the student to do simple drafting and perform routine clerical and production functions. Students completing the major will have a clear understanding of the management controls required to operate manufacturing businesses. This should lead to confidence in doing satisfactory work in computing standards, laying out stations, improving methods, writing job descriptions, estimating costs, and making routine calculations. At the present time this major is not being offered.

FIRST TERM		SECOND TERM	
E.G. 1, Engineering Drawing	Credits 2	E.G. 12, Spatial Analysis	Credits 2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II;	
Engr. 2, Engineering Orientation	1	or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	—	Phys. 150, Technical Physics	3
	9		—
			11
THIRD TERM		+ FOURTH TERM	
I.E. 811, Manufacturing Materials and Processes	Credits 3	Cmp.Sc. 1, Basic Computer Programming	Credits 1
Math. 803, Technical Calculus	3	E.Mch. 811, Elementary Mechanics	3
Phys. 151, Technical Physics	3	I.E. 809, Inspection and Quality Control	3
Social science selection	3	I.E. 812, Manufacturing Processes	3
	—		—
	12		10
FIFTH TERM		SIXTH TERM	
Cmp.Sc. 101, Introduction to Algorithmic Processes	Credits 3	I.E. 816, Methods Analysis and Motion Study	Credits 3
E.Mch. 813, Strength and Properties of Materials	3	I.E. 819, Numerical Control	3
I.E. 315, Industrial Organization and Administration	3	Sp.Com. 200, Effective Speech	3
	—		9
	9		
SEVENTH TERM			
I.E. 810, Production Layout and Control	Credits 3		
I.E. 817, Time Study and Wage Payment	3		
Humanities selection	3		
Technical selection	2-3		
	—		
	11-12		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826 also, but may take an elective.

+Summer term: I.E. 802 for three weeks at University Park only; balance of term at Commonwealth Campus.



## MASS COMMUNICATIONS – ADVERTISING

### MASS COMMUNICATIONS–ADVERTISING

The objectives of this program are to broaden the student's understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop his skill in various aspects of mass communications in order to prepare him for work in areas related to advertising. At the present time this major is not being offered.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Engl. 4, Basic Writing Skills	3	Engl. 10, Composition and Rhetoric I	3
Journ. 800, History and Survey of Mass Communications	3	Journ. 811, Advertising Copywriting	3
So.St. 800, Human Cultures and the Individual	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	<hr/>		<hr/>
	10		12

THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Human. 800, Sources of Morality	3	Arts 1, The Arts	3
Journ. 812, Advertising Layout	3	Journ. 813, Advertising Media and Campaigns	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	<hr/>		<hr/>
	10		10

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Human. 1, Values of the Western Cultural Heritage	3	Music 5, The Fundamentals of Music Appreciation	3
Journ. 814, Newspaper Advertising	3	Journ. 820, Newspaper Management	3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	<hr/>		<hr/>
	10		12

### MASS COMMUNICATIONS–BROADCASTING

The objectives of this program are to broaden the student's understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop his skill in various aspects of mass communications in order to prepare him for work in areas related to broadcasting.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Engl. 4, Basic Writing Skills	3	Engl. 10, Composition and Rhetoric I	3
Journ. 800, History and Survey of Mass Communications	3	Math. 800, Business Mathematics	3
So.St. 800, Human Cultures and the Individual	3	Sp.Com. 801, Radio and Society	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	<hr/>		<hr/>
	10		10



ASSOCIATE DEGREE MAJORS

THIRD TERM		FOURTH TERM	
Human. 800, Sources of Morality	Credits 3	Arts 1, The Arts	Credits 3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Sp.Com. 802, Introductory Radio Programming and Performance	3	Sp.Com. 803, Advanced Radio Programming and Performance	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	—		—
	10		10
FIFTH TERM		SIXTH TERM	
Human. 1, Values of the Western Cultural Heritage	Credits 3	Music 5, The Fundamentals of Music Appreciation	Credits 3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Sp.Com. 804, Business Aspects of Radio Broadcasting	3	Elective	3
Elective	3		—
	—		9
	12		

MASS COMMUNICATIONS—JOURNALISM

The objectives of this program are to broaden the student's understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop his skill in various aspects of mass communications in order to prepare him for work in areas related to journalism.

FIRST TERM		SECOND TERM	
Engl. 4, Basic Writing Skills	Credits 3	Engl. 10, Composition and Rhetoric I	Credits 3
Journ. 800, History and Survey of Mass Communications	3	Journ. 801, Beginning News Writing	3
So.St. 800, Human Cultures and the Individual	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	—		—
	10		12
THIRD TERM		FOURTH TERM	
Human. 800, Sources of Morality	Credits 3	Arts 1, The Arts	Credits 3
Journ. 802, Beginning Reporting	3	Journ. 803, Fundamentals of Editing	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	—		—
	10		10
FIFTH TERM		SIXTH TERM	
Human. 1, Values of the Western Cultural Heritage	Credits 3	Music 5, The Fundamentals of Music Appreciation	Credits 3
Journ. 804, Reporting the Community	3	Journ. 820, Newspaper Management	3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	—		—
	10		12

## MECHANICAL ENGINEERING TECHNOLOGY (DRAFTING AND DESIGN TECHNOLOGY)

This major is intended to prepare detail or layout draftsmen and junior designers for manufacturing industries as well as for the many concerns engaged in installation or erection work. The principal objective is to prepare young men and women for employment in machine design, tool and die design, or structural layout.

FIRST TERM		SECOND TERM	
E.G. 1, Engineering Drawing	Credits 2	E.G. 12, Spatial Analysis	Credits 2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II;	
Engr. 2, Engineering Orientation	1	or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Social science selection	3	Phys. 150, Technical Physics	3
	<hr/> 12		<hr/> 11
THIRD TERM			
E.Mch. 811, Elementary Mechanics	Credits 3		
I.E. 811, Manufacturing Materials and Processes	3		
Math. 803, Technical Calculus	3		
Phys. 151, Technical Physics	3		
	<hr/> 12		
+SUMMER TERM			
I.E. 812, Manufacturing Processes	Credits 3		
		FOURTH TERM	
		E.G. 803, Advanced Engineering Drawing	Credits 3
		E.Mch. 813, Strength and Properties of Materials	3
		I.E. 315, Industrial Organization and Administration	3
		Sp.Com. 200, Effective Speech	3
			<hr/> 12
FIFTH TERM		SIXTH TERM	
Cmp.Sc. 1, Basic Computer Programming	Credits 1	A.E. 809, Structure Design	Credits 3
I.E. 815, Production Design	3	M.E. 810, Product Design	3
M.E. 805, Kinematics	3	Humanities selection	3
Technical selection	2-3	Technical selection	3
	<hr/> 9-10		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826 also, but may take an elective.

+Summer term to be taken at the University Park Campus.

## ASSOCIATE DEGREE MAJORS

### MEDICAL LABORATORY TECHNOLOGY

This two-year program (eight terms) is designed to provide the necessary general and technical training for hospital personnel between the level of the Certified Laboratory Assistant and the Medical Technologist. The program includes one full year of intensive clinical experience at an affiliated hospital and the theoretical background necessary for the clinical procedures performed by the registered Medical Laboratory Technician. The program is a two-year program starting in the summer term. A total of 60-61 credits are required for graduation.

#### I. General Education Requirements (38-39 credits)

Communications (6 credits)

Engl. 10 (3)

Sp.Com. 200 (3)

Quantification (4 credits)

Math 4, 5, or 10 (3)

Cmp.Sc. 1 (1)

Natural Science (19-20 credits)

Biol. 29 (4)

Biol. 41 (3)

Biol. 42 (1)

Chem. 12 (3-4)

Chem. 14 (1)

Chem. 34 (3)

Micrb. 1 (2)

Micrb. 2 (2)

Arts and Humanities (3 credits)

Selection (3)

Social and Behavioral Sciences (6 credits)

Selection (6)

#### II. \*Requirements for the Major (22 credits)

Bioch. 100 (6)

Micrb. 101 (5)

Micrb. 102 (5)

Micrb. 801 (6)

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\*Medical Laboratory Technician clinical experience (22 credits). Affiliation now exists with St. Joseph Hospital, Hazleton, Pennsylvania.

## MINING TECHNOLOGY

A student in mining technology receives a blend of basic sciences, mathematics, communications, humanities and social sciences, and applied courses during the period of study. These courses are sequenced so that basic principles of physical processes are used to understand the specific procedures involved in mining. The curriculum covers a complete spread of material at a level consistent with potential careers of mining technology graduates.

This major prepares students for career positions of a management-oriented or an engineering-oriented nature in the mining industry. Two options, selected at the beginning of the second year, provide a choice between production work and maintenance work. Many of the graduates of this program, after serving the necessary apprenticeship, become certified managers in the fields.

The Maintenance Option prepares a student to become a maintenance supervisor. Initially, the graduate would work as an apprentice electrician or mechanic and would gain experience in repairs and in planned maintenance. Once certification is obtained, it is expected that the graduate would become involved with maintenance planning, working as or with the chief mine mechanic or chief mine electrician.

The Production Option prepares a student to become a mine foreman or an engineering aide. Initially, some of the assigned duties are to run transit and act as survey party chief, keep mine maps up-to-date and make projections, take samples and run analyses, make time studies, and assist with materials handling layouts.

### MAINTENANCE OPTION

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Econ. 14, Principles of Economics	3	Cmp.Sc. 1, Basic Computer Programming	1
Engl. 4, Basic Writing Skills; or		E.G. 1, Engineering Drawing	2
Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I;	
Math. 801, Technical Mathematics	3	or Engl. 20, Composition and Rhetoric II	3
Mng.T. 800, Mining Technology		Math. 802, Technical Mathematics	3
Orientation	1	Phys. 150, Technical Physics	3
	<hr/> 10		<hr/> 12
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Mng.T. 807, Electrical Mine	
E.Mch. 811, Elementary Mechanics	3	Machine Circuits	3
Mng.T. 804, Mine Plant Technology	3	Mng.T. 810, Mine Machine Dynamics	3
Sp.Com. 200, Effective Speech	3	Humanities selection	3
	<hr/> 12	Social science selection	3
			<hr/> 12
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credit</i>
Mng.T. 801, Coal Mining Technology	3	Engl. 826, Report Writing	3
Mng.T. 802, Mine Ventilation	3	Mng.T. 809, Mine Machinery Hydraulics	3
Mng.T. 808, Mine Power Distribution	3	Mgmt. 800, Principles of Management	3
Mng.T. 806, Mine Management and Law	3	Mng.T. 811, Practicum in Mine Maintenance	3
	<hr/> 12		<hr/> 12

ASSOCIATE DEGREE MAJORS

PRODUCTION OPTION

FIRST TERM		SECOND TERM	
Econ. 14, Principles of Economics	Credits 3	Cmp.Sc. 1, Basic Computer Programming	Credits 1
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
Math. 801, Technical Mathematics	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Mng.T. 800, Mining Technology Orientation	1	Math. 802, Technical Mathematics	3
	—	Phys. 150, Technical Physics	3
	10		—
			12
THIRD TERM		FOURTH TERM	
Chem. 11, Introductory Chemistry	Credits 3	G.Sc. 1, Physical Geology; or G.Sc. 20, Our Earth; or G.Sc. 30, Physical and Historical Geology	Credits 3
E.Mch. 811, Elementary Mechanics	3	Min.E. (Metal.) 61, Introduction to Coal Preparation	3
Mng.T. 804, Mine Plant Technology	3	Humanities selection	3
Sp.Com. 200, Effective Speech	3	Social science selection	3
	—		—
	12		12
FIFTH TERM		SIXTH TERM	
Mng.T. 801, Coal Mining Technology	Credits 3	Engl. 826, Report Writing	Credits 3
Mng.T. 802, Mine Ventilation	3	Mng.T. 803, Strata Control	3
Mng. 30, Introduction to Mining Engineering	3	Mng.T. 805, Mine Systems Technology	3
Mng. 806, Mine Management and Law	3	Mng. 23, Mineral Land and Mine Surveying	3
	—		—
	12		12



## NUCLEAR ENGINEERING TECHNOLOGY

This major is designed to provide technically trained personnel to support the rapidly developing nuclear industry between the levels of high school graduate and professional engineer. The wide scope of training received by the nuclear technician prepares him to assist the professional engineer in research, development, testing, manufacture, and maintenance as he pursues a career in radiation safety, reactor operations, radioisotope handling, nuclear and control instrumentation, fuel fabrication, and health physics.

FIRST TERM		SECOND TERM	
E.G. 1, Engineering Drawing	Credits 2	Cmp.Sc. 1, Basic Computer Programming	Credits 1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 801, Fundamentals of D.C. Circuits	3
Engr. 2, Engineering Orientation	1	E.E. 809, D.C. Circuits Laboratory	2
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	—		—
	12		12
THIRD TERM		FOURTH TERM	
Chem. 11, Introductory Chemistry	Credits 3	Nuc.E. 800, Nuclear and Atomic Science	Credits 2
E.E. 814, Electrical Circuits	4	Nuc.E. 805, Principles of Measurement	3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3	Social science selection	3
Math. 803, Technical Calculus	3	Sp.Com. 200, Effective Speech	3
	—		—
	13		11
FIFTH TERM		+SIXTH TERM	
Engl. 826, Report Writing	Credits 3	Nuc.E. 803, Elements of Nuclear Power Generation	Credits 3
M.E. 807, Heat Transfer	3	Nuc.E. 804, Introduction to Reactor Technology	3
Nuc.E. 801, Radiological Safety	2	Nuc.E. 812, Nuclear Technology Laboratory	3
Nuc.E. 802, Elements of Nuclear Technology	2	Nuc.E. 814, Reactor Technology Laboratory	3
Humanities selection	3		—
	—		—
	13		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 also, but may take an elective (suggested courses are E.E. 813, E.E. 816, I.E. 315, Econ. 14). Engl. 826 is required for all students in the program.

+Sixth term is to be taken at the University Park Campus.

ASSOCIATE DEGREE MAJORS

NURSING

This major prepares graduates to practice technical nursing in hospitals or similar health care organizations. After earning the degree of Associate in Nursing, students may write the State Board Test Pool Examination for licensure as registered nurses.

Clinical nursing courses are systematically integrated into the associate degree nursing program. The clinical facilities of Hamot Medical Center and other health care institutions in the metropolitan Erie area are utilized. A total of 77 credits are required for graduation.

Students are responsible for arranging transportation to clinical facilities.

FIRST TERM	Credits	SECOND TERM	Credits
Biol. 29, Mammalian Anatomy	4	Biol. 41, Physiology	3
Psy. 2, Psychology	3	Micrb. 6, Elementary Microbiology	2
Nurs. 800, Foundations of Technical Nursing I	6	Micrb. 7, Elementary Microbiology Laboratory	1
	—	Nurs. 801, Foundations of Technical Nursing II	6
	13		—
			12
THIRD TERM	Credits	FOURTH TERM	Credits
*Engl. 10, Composition and Rhetoric I; or Engl. 4, Basic Writing Skills	3	Nurs. 802, Techniques of Nursing in Childhood	7
+Psy. 13, Introduction to Developmental Psychology	3	Sp.Com. 200, Effective Speech	3
Nurs. 805, Techniques of Nursing the Patient in Senescence	7	**Selection	3
	—		—
	13		13
FIFTH TERM	Credits	SIXTH TERM	Credits
Nurs. 803, Techniques of Nursing the Mature Patient	7	Nurs. 804, Techniques of Nursing the Patient in the Middle Years	7
**Selections	6	‡Nurs. 806, Nursing Seminar	3
	—	**Selection	3
	13		—
			13

\*Students will be placed in Engl. 4 or Engl. 10 on the basis of the English Placement Test scores.

+Psy. 13 must be completed by the end of the third term.

\*\*Three credits must be in arts and humanities. It is recommended that 3 credits be in Chem. 11 if the student has not completed a high school chemistry course and that the remaining credits be taken in the areas of anthropology, chemistry, English, individual and family studies, nutrition, physics, psychology, or sociology.

‡Nurs. 806 may only be taken during the sixth or last term of the program.

## RECREATION AND PARKS

Graduates of this major, which prepares students to assume leadership roles with recreation program participants, may organize and lead recreation activities in program areas such as sports, performing arts, or nature and camping. The graduate may supervise such facilities as community centers, parks, special sports centers, and nature centers in a variety of settings, e.g., municipal recreation and park departments, youth-serving agencies, hospitals, schools, nursing homes, and private or commercial agencies. A total of 64 credits are required for the associate degree.

### RECREATION LEADERSHIP OPTION

	<i>Credits</i>
I. General Education (38 credits)	
A. Communication skills	9
Engl. 4 or 10 (3)	
Engl. 10 or 20 (3)	
Sp.Com. 200 (3)	
B. Science	6
6 credits selected from: Biol. 11; Bi.Sc. 1, 3, 4; Chem. 11;	
G.Sc. 20; Math. 800; Ph.Sc. 7	
C. Arts and humanities	9
A.Ed. 14 (3)	
Thea. 104 (3)	
Thea. 806 (3)	
D. Social and behavioral sciences	6
Psy. 2 or 37 (3)	
Soc. 1 or 5 (3)	
E. Health and physical education	8
Hl.Ed. 303 (2)	
Ph.Ed. 5 (3)	
Team sports	
Lifetime sports	
Swimming	
Ph.Ed. 803, Games for Children (1)	
Ph.Ed. 804, Dance and Gymnastics (1)	
Ph.Ed. 807, Adapted Activities (1)	
II. Requirements for the Major (20-21 credits)	20-21
Rc.Pk. 120, Man and Leisure (3)	
Rc.Pk. 130, Outdoor Living Skills (1)	
Rc.Pk. 150, The Scope of Recreation and Parks Services (1)	
Rc.Pk. 190, The Role of the Recreation and Parks Professional (1)	
Rc.Pk. 230, Camp Counseling (2); or Rc.Pk. 877, Therapeutic Recreation Program (3)	
Rc.Pk. 236, Theory and Practice of Recreation Leadership (3)	
Rc.Pk. 850, Field Practicum (3)	
Rc.Pk. 856, Recreation Program Planning (3)	
Rc.Pk. 875, Introduction to Therapeutic Recreation (3)	
III. Electives (5-6 credits)	5-6

ASSOCIATE DEGREE MAJORS

RETAILING

This major, which trains for positions in retail stores, provides a minimum foundation of a general education, a basis for understanding customer wants and needs, and a technical knowledge of retail procedures. It includes one term of supervised store experience. The major constitutes a well-balanced program for individual growth and development as well as for specialized employment training.

	Credits
I. General Education Requirements (21 credits)	
A. Communication skills	
6 credits in English, Sp.Com. 200	9
B. Biological and physical sciences	
A minimum of 3 credits in each area	6
C. Arts and humanities	
3 credits from either area	3
D. Social and behavioral sciences	
Selected with adviser's approval	3
II. Requirements for the Major (45 credits)	
A. Courses in retailing	
Mktg. 804, 805, 806; H.Dev. 321; M.E.R. 213, 214, 301; Rtl. 840, 850	29
B. Courses in individual development	
I.F.S. 16 (1) plus adviser's recommendations for other college courses	7
C. Professional selections	
Selected with adviser's approval	9

SOCIOLOGY

This major introduces to students the study of human groups and their relationships to each other and to the environment; it enables students to gain some proficiency in the scientific study of group structures and processes. A further objective is to help students become more skillful in working with community institutions, agencies, and organizations either through gainful employment or as a volunteer.

	Credits
I. General Education (35 credits)	
A. Speaking and writing skills	9
Engl. 10 and 20 (6)	
Sp.Com. 200 (3)	
B. Mathematics	3
Math. 4, 5, 6, and 10 are not acceptable	
C. Science	6
Three credits in each of two groups listed below:	
a. Chemistry, physical science, physics	
b. Biological science, biology, botany, psychology, zoology	
c. Astronomy, biochemistry, genetics, geological science, meteorology, microbiology, physical geography	
d. Computer science, statistics, symbolic logic (Phil. 12 or 212 only)	
D. Arts	3
E. Humanities	6
F. Physical education	2
G. Social and behavioral sciences	6
(Not to include sociology)	
II. Requirements for the Major (18 credits)	18
Soc. 1 (3)	
Soc. 3 or 5 (3)	
Soc. 7 (3)	
*Additional credits in sociology (9)	
III. +Electives (7 credits)	7
Total minimum credits required for the associate degree: 60	

\*Selected in consultation with the student's adviser to reflect the student's career and/or basic interests.  
+For students planning to transfer to the B.A. program in either sociology or social welfare, one college-level course in a foreign language must be passed with at least a grade of C. It is also recommended that University Baccalaureate Degree Requirements be considered in so far as practical.



## ASSOCIATE DEGREE MAJORS

### STEEL TECHNOLOGY

This program prepares students for positions in the metallurgical and metals-oriented industries as technical personnel in research laboratories and in quality control, as supervisors of service groups, and as foremen of production operations.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3-4
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Chem. 14, Experimental Chemistry	1
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
Engr. 2, Engineering Orientation	1	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	—		—
	12		11-12
THIRD TERM	<i>Credits</i>		
Metal. 800, Metallurgical Laboratory Practice	4		
Metal. 804, Plant Trips; or Metal. 805, Metallurgical Operations	1		
Phys. 150, Technical Physics	3		
Social science selection	3		
	—		
	11		
SUMMER TERM	<i>Credits</i>		
Mat.T. 804, Summer Field Practice (4); or I.E. 812, Manufacturing Processes (3)	3-4		
		FOURTH TERM	<i>Credits</i>
		E.E. 800, Applied Electricity	2
		G.Sc. 1, Physical Geology; or G.Sc. 20, Our Earth	3
		Metal. 801, Ferrous Metallurgy	3
		Phys. 151, Technical Physics	3
			—
			11
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Geog. 26, Human Geography; or Econ. 14, Principles of Economics	3	I.E. 809, Inspection and Quality Control	3
Humanities selection	3	Mat.T. 803, Materials Testing	4
Metal. 803, Nonferrous Metallurgy	3	Metal. 802, Physical Metallurgy	3
Sp.Com. 200, Effective Speech	3	Metal. 804, Plant Trips; or Metal. 805, Metallurgical Operations	1
	—		—
	12		11

\*Students will be placed in Engl. 4 or Engl. 10 on the basis of English Placement Test scores.

## SURVEYING TECHNOLOGY

The objectives of the major are to provide a knowledge of the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys, and to develop trained personnel who understand the relation between the precision of measurements and the interpretation of data in addition to having an appreciation of the skills and equipment needed to make precise measurements in the field of surveying.

FIRST TERM		SECOND TERM	
C.E. 811, Plane Surveying	Credits 3	C.E. 809, Topographic Drawing	Credits 2
E.G. 1, Engineering Drawing	2	*Engl. 4, Basic Writing Skills;	
Engr. 2, Engineering Orientation	1	or Engl. 10, Composition and Rhetoric I	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	<hr/> 12		<hr/> 11
THIRD TERM			
C.E. 812, Curves and Earthwork	Credits 3		
C.E. 818, Route Surveying	2		
Cmp.Sc. 1, Basic Computer Programming	1		
*Engl. 10, Composition and Rhetoric I;			
or Engl. 20, Composition and Rhetoric II	3		
Math. 803, Technical Calculus	3		
	<hr/> 12		
SUMMER TERM			
C.E. 813, Practical Field Problems	Credits 4		
		FOURTH TERM	
		C.E. 816, Special Surveys	Credits 3
		C.E. 817, Cartographic Techniques	2
		E.G. 12, Spatial Analysis	2
		E.Mch. 810, Basic Mechanics	2
		Sp.Com. 200, Effective Speech	3
			<hr/> 12
FIFTH TERM		SIXTH TERM	
C.E. 810, Statistics and Least Squares	Credits 3	C.E. 815, Geodetic Surveying	Credits 3
C.E. 814, Photogrammetry	3	C.E. 890, Legal Aspects of Surveying	2
Engl. 826, Report Writing	3	Humanities selection	3
Pl.Sc. 1, American National Government	3	Technical selection	2-3
	<hr/> 12		<hr/> 10-11

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 also, but may take an elective. Engl. 826 is required for all students in the program.

## ASSOCIATE DEGREE MAJORS

### WILDLIFE TECHNOLOGY

This program will prepare a student in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and care, maintenance, and propagation of animals. They will support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
E.G. 10, Introductory Engineering Graphics	1	C.E. 809, Topographic Drawing	2
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I; or Engl. 826, Report Writing	3
For. 802, Dendrology	2	Math. 801, Technical Mathematics I	3
Wildl. 801, Introduction to Wildlife Management	3	Wildl. 804, Wildlife Mensuration	3
	<hr/>		<hr/>
	9		11
THIRD TERM			
	<i>Credits</i>		
Wildl. 803, Animal Identification	3		
Wildl. 812, Wildlife Field Surveys	3		
Wildl. 814, Habitat Management	3		
	<hr/>		
	9		
SUMMER TERM			
	<i>Credits</i>		
Wildl. 805, Field and Laboratory Techniques	3		
Wildl. 806, Operational Procedures and Equipment	2		
	<hr/>		
	5		
		FOURTH TERM	
			<i>Credits</i>
		Sp.Com. 200, Effective Speech	3
		For. 808, Forest Protection	3
		Wildl. 807, Outdoor Recreation	3
		Social science selection	3
			<hr/>
			12
FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
For. 812, Elements of Project Supervision in Forestry	3	Acctg. 816, Introductory Accounting Survey	3
Wildl. 809, Animal Care	3	Human. 801, Science, Technology, and Human Values	3
Wildl. 811, Aerial Photo Interpretation	4	Wildl. 813, Fisheries Management for Technicians	3
	<hr/>		<hr/>
	10		9

## COURSE DESCRIPTIONS

### CREDITS AND HOURS

A credit requires three 75-minute periods per week of an average student's time. The distribution of that time between class activities (such as lecture, recitation, laboratory, field trip, etc.) and outside preparation varies from course to course.

Credits, classroom work, and laboratory work are indicated by three numbers in parentheses immediately following the course title.

1. The first number shows the maximum course credits and therefore the total time required by the course per week. For example, a 2-credit course normally requires 7½ hours per week for class activity and individual preparation.
2. The second number shows the periods of classroom work (a period is 75 minutes), including lecture, recitation, class discussion, demonstration, or various combinations of these.
3. The third number shows the periods of practicum room work (a period is 75 minutes), including laboratory, shop work, studio, drafting room, field trips, etc.

Courses numbered from 800 to 899 are reserved for the associate degree majors. Credit received for 800-series courses is not applicable to any baccalaureate degree program offered by the University with the exception of programs offered by Capitol Campus. Courses numbered from 1 to 399 carry baccalaureate credit and are required in most of the associate degree majors. Elective credit courses vary from campus to campus and term to term. Information regarding such offerings may be obtained from the *Schedule of Classes* for the various campuses.

### ACCOUNTING (ACCTG)

16. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Accounting for proprietorships, partnerships, and corporations for retailers and manufacturers; financial statement analysis. Students who have passed Acctg. 101 may not schedule this course.
101. INTRODUCTORY FINANCIAL ACCOUNTING (3:2:1½) Fundamentals of the collection, recording, summarization, and interpretation of accounting data.
102. INTRODUCTORY MANAGERIAL ACCOUNTING (3:2½:1) Actual and standard cost systems; managerial uses of cost data. Prerequisite: Acctg. 101.
801. INTRODUCTORY ACCOUNTING (3:2:1)
802. INTRODUCTORY ACCOUNTING (3:2:1) Prerequisite: Acctg. 801.
803. INTERMEDIATE ACCOUNTING (3:3:0) Financial accounting statements, concepts, and procedures; assets, liabilities, owners' equity, statement analysis. Prerequisite: Acctg. 802.
806. FEDERAL TAX ACCOUNTING (3:3:0) Federal tax revenue system as it affects the individual and business; tax planning, research and preparation of returns. Prerequisite: Acctg. 802.
807. MANAGERIAL ACCOUNTING (3:3:0) Cost and budgetary control; preparation of information for decision making. Prerequisite: Acctg. 802.
816. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Fundamentals of accumulation and summarization of accounting data; emphasis on financial statement analysis and the uses of accounting in business.



## COURSE DESCRIPTIONS

### AEROSPACE ENGINEERING TECHNOLOGY (AERSP)

800. APPLIED AERODYNAMICS (3:3:0) Fluid mechanics; characteristics of wings and airfoils, drag estimation, aircraft performance and static stability. Prerequisite: Phys. 151.
802. AIRCRAFT STRUCTURAL ANALYSIS (3:3:0) Truss analysis; shear flow; thin-webbed beams; box beams; semimonocoque structures; joints and fittings; members in tension and compression. Prerequisite: E.Mch. 813.
803. TECHNICAL AERODYNAMICS (3:3:0) Potential flow; airfoil theory, vortex systems, wing theory, viscous flow, boundary layers. Prerequisite: Aersp. 800.
804. AIRCRAFT PROPULSION (3:3:0) Piston and turbine engines; thermodynamics; propellers; compressor and turbine design; operating characteristics; chemical rockets. Prerequisite: Aersp. 803.
806. COMPUTER APPLICATIONS TO AEROSPACE ENGINEERING (3:1:5) Digital and analog computer programming, application to aircraft performance, stability and control, nonlinear and simultaneous differential equations. Prerequisites: Cmp.Sc. 1, Aersp. 800.
807. AIRCRAFT STRUCTURAL DESIGN (3:1:4) Aerodynamic and inertia loads; aircraft materials; fasteners; design of components; design layout. Prerequisites: Aersp. 802, 803.
808. ELECTRONIC INSTRUMENTATION (3:1:5) Electrical measurements, power supplies, amplifiers, oscillators, servo systems, operational amplifiers, switching and counting systems. Prerequisite: E.E. 800.
809. AEROSPACE LABORATORY (3:1:5) Velocity measurements; force measurements; subsonic and supersonic wind tunnel testing; static and dynamic structural testing; flight testing; power-required determination. Prerequisite: Aersp. 800.
810. PRINCIPLES OF FLIGHT (3:2:3) Airplane principles, navigation, meteorology, F.A.A. regulations; airplane performance, flight experiments, flight instruction. Prerequisite: Aersp. 800.
830. SELECTED TOPICS IN AEROSPACE ENGINEERING TECHNOLOGY (3) Individual or group work in aerospace engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

### AGRICULTURAL ECONOMICS (AG EC)

800. THE AGRICULTURAL ECONOMY (3:3:0) A survey of the agricultural economy; nature, scope and trends of ag-industry; and agriculture in the national perspective.
801. MANAGEMENT OF COMMERCIAL FARMS (3:2:2) Methods of analysis to determine farm organization, and profitability of alternate enterprises, capital investments, and use of production resources.
802. AGRICULTURAL MARKETING AND SALES (3:3:0) Marketing channels, services, costs, and price relationships involved in distributing farm supplies and agricultural products.
803. INTRODUCTION TO AGRICULTURAL BUSINESS (3:3:0) Economic principles which determine the supply, demand, and price of agricultural products and provide methodology for management decisions.

### AGRICULTURAL ENGINEERING (AG E)

800. FARM POWER (2:1:2) Principles and performance characteristics of tractors, electric motors, and other power units; application and maintenance of farm power equipment.
801. FARM STRUCTURES AND UTILITIES (3:2:2) Planning for efficient utilization of buildings, power, and equipment for materials handling and environmental control in agricultural production and processing.



## ANIMAL SCIENCE (AN SC)

800. **LIVESTOCK PRODUCTION (2:1:2)** The livestock and meat industry in the United States; management of commercial beef, swine, and sheep enterprises.
801. **POULTRY PRODUCTION (2:1:2)** Practical aspects of poultry nutrition, management, disease control, and marketing in the production of broilers, eggs, and turkeys.
802. **DAIRY PRODUCTION (2:1:2)** The feeding, management, breeding, milking, disease control, and housing of dairy cattle; economic factors contributing toward the enterprise.

## ARCHITECTURAL ENGINEERING TECHNOLOGY (A E)

801. **BUILDING MATERIALS (2:2:0)** Structural and architectural use of building materials and construction assemblies.
802. **METHODS OF CONSTRUCTION I (3:0:9)** Materials and methods of construction used in buildings, as expressed in drawings. Prerequisites: A.E. 801, E.G. 3.
803. **PLUMBING, FIRE PROTECTION AND ELECTRICAL LAYOUT (3:1:6)** Layout of plumbing, fire protection and electrical distribution in buildings to meet code and usage requirements. Prerequisite or concurrent: A.E. 802.
804. **HEATING, VENTILATING AND AIR CONDITIONING LAYOUT (3:1:6)** Fundamental calculations and layout of systems in buildings. Prerequisite: A.E. 803.
805. **ARCHITECTURAL RENDERING (2:0:6)** Architectural rendering techniques, including use of shade and shadow; color. Prerequisite: E.G. 3.
807. **METHODS OF CONSTRUCTION II (2:0:6)** Integration of materials and systems in working drawings. Prerequisites: A.E. 802, 809.
808. **GRAPHIC ANALYSIS (2:0:6)** Graphical analysis of force systems, centers of gravity, stresses in framed structures, arches, walls, moments and deflections of beams. Prerequisites: E.G. 12, E.Mch. 811.
809. **STRUCTURE DESIGN (3:1:6)** Elementary principles of structural design and detailing in timber, steel, and reinforced concrete; use of handbooks; fundamentals of structural and architectural drafting. Prerequisites: E.G. 803, E.Mch. 813.
810. **ARCHITECTURAL ENGINEERING OFFICE PRACTICE (2:2:0)** Procedures involved in production of contract documents, both drawings and specifications. Prerequisite: sixth-term standing.
812. **BUILDING LIGHTING AND ACOUSTICS (3:2:2)** Fundamentals of lighting layout and calculations; fundamentals of building acoustics and noise control; studio-laboratories. Prerequisites: Phys. 151, Math. 803.
830. **SELECTED TOPICS IN ARCHITECTURAL ENGINEERING TECHNOLOGY (3)** Individual or group work in architectural engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ART EDUCATION (A ED)

14. **INTRODUCTORY CRAFTS FOR TEACHERS (3:1:5)** Direct experience with materials such as wood, clay, metal, paper, textiles, and plastics in relationship to the creative needs of children.
806. **ARTS AND CRAFTS (3:1:5)** An introduction to arts and crafts processes, experiences, and materials appropriate for community centers, playgrounds, etc.; designed for recreation leadership.

## **COURSE DESCRIPTIONS**

### **ART HISTORY (ART H)**

100. **INTRODUCTION TO ART (3:3:0)** An approach to the understanding of art through a critical analysis of selected works of architecture, painting, and sculpture. Students who have passed Art H. 110 may not schedule this course.

110. **SURVEY OF WESTERN ART (3:3:0)** General survey of major developments in architecture, painting, and sculpture in the Western world. Students who have passed Art H. 100 may not schedule this course.

305. **MODERN PAINTING (3:3:0)** The development of painting from the French Revolution to the present.

307. **AMERICAN ART (3:3:0)** History of art in the English colonies and the United States from the seventeenth century to the present.

### **THE ARTS (ARTS)**

1. **THE ARTS (3:3:0)** Developing perception in the arts through relating the visual, musical, performing and environmental arts.

### **BIOCHEMISTRY (B CHEM)**

100. **CLINICAL CHEMISTRY FOR MEDICAL LABORATORY TECHNICIANS (6:3:6)** Theoretical and practical concepts associated with clinical chemistry testing procedures used in the diagnosis of human diseases. Prerequisite: Chem. 34.

### **BIOLOGICAL SCIENCE (BI SC)**

1. **STRUCTURE AND FUNCTION OF ORGANISMS (3:3:0)** Origin, development, and cellular basis of life; fundamental principles, processes and structures of organisms. Students who have passed Biol. 11, 12, 13, 27, or 41 may not schedule this course.

2. **EVOLUTIONARY RELATIONSHIPS OF ORGANISMS (3:3:0)** Examination of the biological world in terms of reproduction, genetics, evolution, development, diversity; interrelationships and interdependence of organisms, populations, communities.

3. **MAN AND HIS ENVIRONMENT (3:3:0)** Kinds of environments; past and present uses and abuses of natural resources; disposal of man's wastes; prospects for the future. Students who have passed Biol. 210 or any other upper-level ecology course in biology may not schedule this course.

4. **BIOLOGY OF MAN (3:3:0)** A general survey of structure and function in man—from conception, through growth and reproduction, to death. Students who have passed Biol. 29 and 41 may not schedule this course.

### **BIOLOGY (BIOL)**

11. **LIFE SCIENCE (3:2:2)** Structure, metabolism, development, reproduction, and evolution of plants and animals.

29. **MAMMALIAN ANATOMY (4:2:4)** Anatomy of a mammal, with special reference to that of man. Students who have passed Biol. 421 may not schedule this course.

41. **PHYSIOLOGY (3:3:0)** Normal functions of the animal body, with special reference to those of man. Students who have passed Biol. 472 may not schedule this course.

## BIOMEDICAL EQUIPMENT TECHNOLOGY

42. **PHYSIOLOGY LABORATORY (1:0:2)** Experiments demonstrating basic physiological principles with special reference to man. Prerequisite or concurrent: Biol. 41.

### BIOMEDICAL EQUIPMENT TECHNOLOGY (B E T)

801. **PHYSIOLOGICAL TRANSDUCERS (3:2:2)** Study of the principles of operation and applications of devices used for the conversion of physiological events to electrical signals. Concurrent: E.E. 816.

802. **BIOMEDICAL INSTRUMENTATION AND SYSTEMS (3:2:2)** Introduction to the operating principles, calibration, and maintenance of biomedical instruments and systems with special emphasis given to patient safety. Prerequisite: B.E.T. 801.

803. **BIOMEDICAL EQUIPMENT LABORATORY (INTERNSHIP) (4:1:6)** This course is intended to provide practical experience, within the hospital environment, on a variety of biomedical instruments. Prerequisites: B.E.T. 802, M.E. 881, Biol. 41.

830. **SELECTED TOPICS IN BIOMEDICAL EQUIPMENT TECHNOLOGY (3)** Individual or group work in biomedical equipment technology for students with specific occupational objectives. Prerequisite: fourth-term standing.

### BUSINESS ADMINISTRATION (B A)

803. **COOPERATIVE PRACTICUM WITH BUSINESS OFFICES (6:0:12)** Cooperative practical work with business offices under the supervision of the instructor.

### BUSINESS LAW (B LAW)

843. **INTRODUCTION TO BUSINESS LAW (3:3:0)** Legal institutions; basic legal principles pertaining to individual and contractual rights, with special emphasis on business operations and transactions.

850. **REAL ESTATE LAW (3:3:0)** Basic legal principles involved in the negotiation of real estate transactions. Prerequisite: B.Law 843.

### BUSINESS LOGISTICS (B LOG)

102. **PHYSICAL DISTRIBUTION (3:3:0)** Physical distribution function in business; role played by transportation, warehousing, location, inventory control; concept of a business logistics system. Prerequisite: fourth-term standing.

104. **TRANSPORT SYSTEMS (3:3:0)** Conceptual model of a transport system; environmental relationships; modal components and internal constraints, with special application to the United States. Prerequisite: fourth-term standing.

206. **TRAFFIC MANAGEMENT (3:3:0)** Analysis of the traffic function in the logistics system. Evaluation of routes, rates and shipping document procedures. Prerequisite: B.Log. 102 or 104.

### CHEMICAL ENGINEERING TECHNOLOGY (CH E)

800. **TECHNICAL CALCULATIONS (3:3:0)** Engineering units and their conversion. Technique of solving elementary problems in industrial stoichiometry, material balances, and heats of reaction. Prerequisite or concurrent: Chem. 13 and 15.



## COURSE DESCRIPTIONS

802. **CHEMICAL TECHNOLOGY (3:3:0)** Introductory discussion and problems relating to flow of fluids and transfer of heat. Prerequisite: Ch.E. 800.
803. **CHEMICAL TECHNOLOGY (3:3:0)** Elementary discussion and problems involving evaporation, distillation, and air-water interaction. Prerequisite: Ch.E. 800.
820. **CHEMICAL TECHNOLOGY LABORATORY (4:2:6)** Measurements in fluid flow, heat transfer, distillation, mass transfer; chemical analytical techniques; industrial laboratory report writing. Prerequisite or concurrent: Ch.E. 803.
830. **INDUSTRIAL CHEMISTRY (3:3:0)** The commercial preparation of important chemicals and derivatives with emphasis upon the chemistry involved and the flow of material. Prerequisite or concurrent: Chem. 13 and 15.
831. **SELECTED TOPICS IN CHEMICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in chemical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## CHEMISTRY (CHEM)

11. **INTRODUCTORY CHEMISTRY (3:2:2)** Selected principles and applications of chemistry. Prior study of chemistry not assumed.
12. **CHEMICAL PRINCIPLES (3-4)** Basic concepts and quantitative relations. Prerequisite: Satisfactory performance on placement examination—students take Chem. 12 for 3 credits. Unsatisfactory performance on placement examination—students take Chem. 12 for 4 credits.
13. **CHEMICAL PRINCIPLES (3:3:0)** Continuation of Chem. 12, including an introduction to the chemistry of the elements. Prerequisite: Chem. 12. Prerequisite or concurrent: Chem. 14.
14. **EXPERIMENTAL CHEMISTRY (1:0:3)** Introduction to quantitative experimentation in chemistry. Prerequisite or concurrent: Chem. 12.
15. **EXPERIMENTAL CHEMISTRY (1:0:3)** Continuation of Chem. 14 with emphasis on analytical procedures. Prerequisite: Chem. 14. Prerequisite or concurrent: Chem. 13.
23. **INTRODUCTION TO MODERN ANALYTICAL CHEMISTRY (4:2:4)** Contemporary methods of chemical and instrumental analysis, including potentiometric titration, specific ion electrodes, spectrophotometry, and chromatography. Prerequisite: Chem. 15.
34. **ORGANIC CHEMISTRY (3:3:0)** Introduction to organic chemistry with emphasis on the properties of organic compounds of biochemical importance. Prerequisite: Chem. 11 or 12.
35. **ORGANIC CHEMISTRY (3:2:4)** Introduction to organic chemistry with emphasis on the identification of organic compounds by characteristic chemical reactions and by spectroscopy. Prerequisite: Chem. 34.
800. **GENERAL CHEMISTRY (3:2:3)** Basic principles of chemistry; properties and uses of some industrially important elements and compounds.

## CIVIL ENGINEERING TECHNOLOGY (C E)

809. **TOPOGRAPHIC DRAWING (2:0:6)** Conventional mapping symbols; constructing topographic maps from stadia notes; estimating grading quantities from topographic maps. Prerequisite: E.G. 1 or E.G. 10. Prerequisite or concurrent: C.E. 811 or Wildl. 812.
810. **STATISTICS AND LEAST SQUARES (3:2:2)** Frequency distribution; histograms; frequency polygons; measures of central tendency; dispersion; uses of normal curve; least squares applied to surveying problems. Prerequisite: Math. 803. Prerequisite or concurrent: C.E. 815.
811. **PLANE SURVEYING (3:2:3)** Theory of plane surveying; use, care, and adjustments of

## CLOTHING AND TEXTILES

surveying equipment; traversing, areas, leveling, stadia, and plane table mapping. Prerequisite or concurrent: Math. 801.

812. **CURVES AND EARTHWORK (3:2:3)** Computation and laying out of horizontal and vertical curves; calculation of cut and fill; setting slope stakes for construction. Prerequisite or concurrent: C.E. 811, Math. 802.

813. **PRACTICAL FIELD PROBLEMS (4)** Geodetics, topography, field astronomy; route location; hydrographic surveys; land subdivision; use of electronic measuring devices. Prerequisites: C.E. 812, 818.

814. **PHOTOGRAMMETRY (3:1:6)** Interpretation and use of aerial photographs; mapping by photogrammetric methods; application of aerial and terrestrial photographic surveying to specific engineering problems. Prerequisite: C.E. 818.

815. **GEODETIC SURVEYING (3:1:6)** Precision vertical and horizontal control surveys; level nets; reciprocal leveling; triangulation; state plane coordinates; astronomic observations for azimuth and latitude. Prerequisites: C.E. 811, Math. 802.

816. **SPECIAL SURVEYS (3:1:6)** Applications of surveying in hydrography, mining, construction, and subdivision planning; surveying registration law and professional ethics. Prerequisites: C.E. 812, 813.

817. **CARTOGRAPHIC TECHNIQUES (2:0:6)** Use of tools and equipment; projections used in art, advertising, navigation, government maps; relief methods; scribing techniques; map reproduction methods. Prerequisite: C.E. 809.

818. **ROUTE SURVEYING (2:0:5)** Field and office operations connected with highway and railroad location; mass diagram as related to economical distribution of earthwork. Prerequisite: C.E. 811. Concurrent: C.E. 812.

821. **CONCRETE TECHNOLOGY (3:2:3)** Characteristics of Portland cement concrete, physical properties of constituent materials, testing procedures, basics of reinforced concrete. Prerequisite: E.Mch. 813.

822. **SOIL MECHANICS (3:2:3)** Identification, classification, sampling, testing, handling, and consolidation of soils for highway construction. Prerequisites: E.Mch. 810, Phys. 151.

823. **HIGHWAY ORGANIZATION AND OPERATIONS (3:3:0)** Fundamentals of technology; plans and specifications; drainage, cost, traffic studies, and highway safety. Prerequisite: second-year standing in Highway Engineering Technology.

824. **ASPHALT TECHNOLOGY (3:2:3)** The use and testing of asphaltic material as adapted to highways.

825. **CONSTRUCTION ESTIMATING (3:3:0)** Job organization, estimating, cost control, construction methods and equipment for highway construction projects.

830. **SELECTED TOPICS IN CIVIL ENGINEERING TECHNOLOGY (3)** Individual or group work in civil engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

861. **FLUID FLOW (3:3:0)** Elementary theory of fluid flow: hydrostatics; flow through orifices, Venturi meters, and pipes; flow in open channels; theory of the centrifugal pump. Prerequisites: E.Mch. 810 or 811, Math. 802.

890. **LEGAL ASPECTS OF SURVEYING (2:2:0)** Legal principles affecting the determination of property boundaries; responsibilities of surveyors, attorneys, title companies, and the court. Prerequisite: C.E. 811.

## CLOTHING AND TEXTILES (CL TX)

835. **PREPARATION FOR PRACTICUM (1:1:0)** Analysis of employee responsibilities in an operating store situation; preparation for ten weeks of approved store experience. Prerequisite: third-term standing.



## COURSE DESCRIPTIONS

836. PRACTICUM (2) A minimum of ten weeks of practical store experience approved by the student's major adviser, including an acceptable written report. Prerequisites: Cl.Tx. 835, Com. 804, 805.

## COMMUNITY DEVELOPMENT (COM D)

7. INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0) An introduction to the study of community, community systems, and impact on the individual.

870. COMMUNITY LEADERSHIP (2:2:1) Principles and techniques of participation in voluntary community groups concerned with strengthening family and community life.

## COMPUTER SCIENCE (CMPSC)

1. BASIC COMPUTER PROGRAMMING (1:0:2) Fundamental characteristics of digital computers; organization and coding of problems for solution on digital computer. Prerequisite: 2 entrance units in mathematics.

44. TECHNIQUES OF ORGANIZATION (3:3:1) Programming sequential and random access devices. Methods of organizing, sorting, merging files on secondary storage devices. Prerequisite: Cmp.Sc. 140.

54. INTRODUCTION TO OPERATING SYSTEMS (3:3:1) Techniques in multiprogramming, queueing, scheduling, handling of interrupts from peripheral devices. Prerequisite: Cmp.Sc. 44.

64. CONTEMPORARY TRENDS IN COMPUTER PROGRAMMING (3:3:0) State of the technology in the design of data-language processors, information processing systems, and large production programs in EDP. Prerequisite: Cmp.Sc. 54.

101. INTRODUCTION TO ALGORITHMIC PROCESSES (3:3:0) Properties of algorithms, languages, and notations for describing algorithms; applications of a procedure-oriented language to problem solving. Students who have passed Cmp.Sc. 201, 203, 401, or 402 may not schedule this course. Prerequisite: 2 entrance units in mathematics.

102. COMPUTER ORGANIZATION AND PROGRAMMING (3:3:0) Computer components and organization, representation of numbers and characters, instruction codes, machine-language programming, assembly systems, input-output, subroutines, and macros. Students who have passed Cmp.Sc. 211 or 410 may not schedule this course. Prerequisite: Cmp.Sc. 101.

140. INTRODUCTION TO DATA PROCESSING (3:3:0) Applications of digital computers to problems in data processing with examples from accounting, record updating, inventory control, and report generation. Prerequisite: Cmp.Sc. 101.

804. UNIT RECORD PROCESSING (1:1:2) Principles and practices of unit record processing.

805. COMPUTER APPLICATION PROBLEM (1-3) The organization, flow charting, programming, debugging, and documentation of a major applied problem in a field of computer application. Prerequisite: fifth-term standing.

890. SPECIAL TOPICS IN COMPUTER PROGRAMMING (1-3) Application of any of several specific computer programming languages to problem solving. Prerequisite: Cmp.Sc. 101.

## ECONOMICS (ECON)

2. INTRODUCTORY MICROECONOMIC ANALYSIS AND POLICY (3:3:0) Methods of economic analysis and their use; economic aggregates; price determination; theory of the firm; distribution.

4. INTRODUCTORY MACROECONOMIC ANALYSIS AND POLICY (3:3:0) National income measurement; aggregate economic models; money and income; policy problems.

## ELECTRICAL ENGINEERING TECHNOLOGY

14. **PRINCIPLES OF ECONOMICS (3:3:0)** Analysis of the American economy, emphasizing the nature and interrelationships of such groups as consumers, business, governments, labor, and financial institutions. Students who have passed Econ. 2 or are registered in the College of Business Administration may not schedule this course.

315. **LABOR ECONOMICS (3:3:0)** An economic analysis of the labor market. Prerequisite: Econ. 2.

## ELECTRICAL ENGINEERING TECHNOLOGY (E E)

800. **APPLIED ELECTRICITY (2:1:3)** Fundamentals of electric circuits; basic principles of electrical machinery and devices; electrical-mechanical analogies; beginning electronics. Prerequisite: Math. 801.

801. **FUNDAMENTALS OF D.C. CIRCUITS (3:3:0)** Fundamental theory of resistance, current, voltage. Direct-current circuit concepts developed from simplest series circuit through loop analysis; Thevenin's theorem. Prerequisite: Math. 801.

804. **A.C. CIRCUITS (2:2:0)** Application of network theorems, laws, and methods to alternating-current circuits; balanced and unbalanced polyphase systems. Prerequisite: E.E. 814.

807. **A.C. AND ELECTRONICS LABORATORY (2:0:6)** Laboratory study of alternating-current circuits and semiconductors; assembly and tracing of electrical and electronic circuits. Must be taken with E.E. 804 and 810. Prerequisite: E.E. 818.

809. **D.C. CIRCUITS LABORATORY (2:0:4)** Introduction to electrical apparatus, including instruments, their interconnection into basic circuits, observation of circuit behavior, and report writing. Must be taken with E.E. 801.

810. **FUNDAMENTALS OF SEMICONDUCTORS (3:3:0)** Semiconductor physics and circuit theory including hybrid parameters; equivalent circuits; power amplifiers and frequency response of small signal amplifiers. Prerequisites: E.E. 814, Math. 803.

813. **FUNDAMENTALS OF ELECTRICAL MACHINES (3:2:2)** Direct-current machinery principles and applications; introduction to machines and basic concepts of laboratory methods related to machinery studies. Prerequisites: E.E. 814, 818.

814. **ELECTRICAL CIRCUITS (4:4:0)** Direct-current circuit analysis; introduction to basic magnetism and magnetic circuits; single-phase circuit fundamentals. Prerequisites: E.E. 801, Math. 802.

815. **A.C. MACHINERY AND CONTROL (4:4:0)** Alternating-current machinery principles and applications; survey of alternating- and direct-current machinery control methods. Prerequisites: E.E. 804, 813.

816. **LINEAR ELECTRONIC CIRCUITS (3:3:0)** Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, vacuum tubes and operational amplifiers. Prerequisite: E.E. 810.

817. **ADVANCED ELECTRONICS (4:4:0)** Fundamentals and application of pulse and digital circuits and electronic devices, such as unijunction transistors, photo devices, and zener diodes. Prerequisite: E.E. 816.

818. **ELECTRICAL CIRCUITS LABORATORY (1:0:2)** Laboratory study of direct-current networks and alternating-current circuits. Must be taken with E.E. 814. Prerequisite: E.E. 809.

819. **A.C. MACHINERY LABORATORY (1:0:2)** Alternators, induction generators, single- and polyphase motors, synchro units; transformers, saturable reactors, and protective devices. Must be taken with E.E. 815. Prerequisite: E.E. 807.

820. **ADVANCED ELECTRONICS LABORATORY (2:0:4)** Laboratory study of solid state pulse, digital, industrial and motor control circuits. Must be taken with E.E. 817. Prerequisite: E.E. 821.

821. **LINEAR ELECTRONICS LABORATORY (1:0:2)** Laboratory study of transistors; study of

## COURSE DESCRIPTIONS

differential and operational amplifiers. Emphasis is placed on circuit design. Must be taken with E.E. 816. Prerequisite: E.E. 807.

830. **SELECTED TOPICS IN ELECTRICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in electrical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING (ENGR)

2. **ENGINEERING ORIENTATION (1:0:2)** Introduction to efficient methods for analyzing and solving engineering problems.

5. **EXPERIMENTAL METHODS FOR ENGINEERS (1:0:2)** Introduction to experimental methods used in engineering. Applications of basic experimental and computational concepts through student involvement in laboratory experiments.

801. **INTRODUCTION TO ENGINEERING (0:1:0)** Introduction to all functions and branches of engineering through general lectures.

## ENGINEERING GRAPHICS (E G)

1. **ENGINEERING DRAWING (2:0:5)** Technical skills and drafting room practices; fundamentals of theoretical graphics; orthogonal, oblique, and perspective projections; working and schematic drawings.

3. **ARCHITECTURAL GRAPHICS (2:0:6)** Principles of architectural drawing; spatial relationships of points, lines, planes, and solids with architectural applications; shadows, perspective.

10. **INTRODUCTORY ENGINEERING GRAPHICS (1:0:3)** Multiview projections, pictorials, space analysis, graphs, graphical mathematics.

11. **ENGINEERING DESIGN GRAPHICS (1:0:3)** Introduction to creative design; design implementation and working drawings, vector analysis, dimensioning and engineering standards. Prerequisite: E.G. 10.

12. **SPATIAL ANALYSIS (2:0:5)** Spatial relations of points, lines, and solids, with engineering applications. Prerequisite: 1 credit of introductory graphics.

800. **DRAWING ROOM STANDARDS AND PRACTICES (2:0:6)** Interpretation of various types of engineering drawings, including dimensional systems, symbols, and American standard drafting room practices. Prerequisite: E.G. 10.

803. **ADVANCED ENGINEERING DRAWING (3:1:6)** Application of principles of engineering drawing, including auxiliary views in the layout of detail, assembly, and working drawings. Prerequisite: E.G. 1.

830. **SELECTED TOPICS IN ENGINEERING GRAPHICS (1-3)** Individual or group work in engineering graphics offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING MECHANICS (E MCH)

810. **BASIC MECHANICS (2:2:0)** Forces; moments; resultants; equilibrium of force systems; introduction to dynamics. Prerequisite: Math. 801.

811. **ELEMENTARY MECHANICS (3:3:0)** Forces; moments; resultants; equilibrium of force systems; friction; centroids and moment of inertia of areas; dynamics of particles. Prerequisite: Math. 801.

812. **INTRODUCTION TO DYNAMICS (3:2:2)** Absolute and relative motion related to parti-



cles and simple linkages. Force-mass-acceleration, work-energy, and impulse-momentum solution techniques. Prerequisite: 3 credits of E.Mch. 811. Prerequisite or concurrent: Math. 803.

813. **STRENGTH AND PROPERTIES OF MATERIALS (3:3:0)** Axial stress and strain; shear; riveted and welded connections; torsion; beam stresses and deflections; combined axial and bending stresses; columns; ductility, resilience, and toughness. Prerequisite: E.Mch. 811.

## ENGLISH (ENGL)

\*4. **BASIC WRITING SKILLS (1-3)** Intensive instruction in grammar, usage, and punctuation, and practice in writing sentences and paragraphs. Designed for students with deficient preparation. This course will not be acceptable as satisfying the communications category of the associate or Baccalaureate Degree Requirements.

10. **COMPOSITION AND RHETORIC I (3:3:0)** Organizing and writing clear expository essays. Prerequisite: satisfactory English Placement Test scores or Engl. 4 (3 credits) or concurrent with Engl. 4 (1 credit).

20. **COMPOSITION AND RHETORIC II (3:3:0)** Building and presenting cogent written arguments, with attention to style. Prerequisite: Engl. 10.

30. **HONORS FRESHMAN COMPOSITION (3:3:0)** Writing practice for specially qualified and screened students. Students who are exempt from Engl. 10 and have passed a special writing test will qualify for this course.

826. **REPORT WRITING (3:3:0)** Interpretation of statistical data and writing of technical reports. Prerequisite: Engl. 4 or 10.

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\*Although open to all students, it is especially designed to precede or supplement Engl. 10. Enrollment *either* on the basis of test scores, at the beginning of the term (3 credits), *or* from the first through sixth weeks of the term (1 credit).

## FINANCE (FIN)

108. **PERSONAL FINANCE (3:3:0)** Personal management of budgets, bank accounts, loans, credit buying, insurance, real estate and security buying. May not be scheduled by College of Business Administration students. Prerequisite: fourth-term standing.

210. **COMMERICAL BANK MANAGEMENT (3:3:0)** Fundamental principles underlying management of a commercial bank; capital funds; asset and liability management; value maximization; legal and operational constraints. Prerequisite: Fin. 105.

807. **BANKING AND CORPORATE FINANCE (3:3:0)**

## FOOD SERVICE AND HOUSING ADMINISTRATION (FS HA)

50. **IN-SERVICE TRAINING (0-1)** Eight weeks or 300 hours of practical experience in operations of the type in which the student is majoring.

102. **INTRODUCTION TO FOOD SERVICE AND HOUSING ADMINISTRATION (3:3:0)** Professional duties of management personnel in large food and housing operations, their working conditions, and organizations which they serve.

103. **INTRODUCTION TO HEALTH FACILITIES FOOD SERVICE ADMINISTRATION (3:3:0)** Professional functions of the hospital food service system, relationships with the nutrition component of food service system, and organization served.

## **COURSE DESCRIPTIONS**

225. **FOOD AND LABOR MANAGEMENT AND CONTROL (3:3:0)** Techniques for analyzing and controlling costs in hospitality organizations. Prerequisite: 3 credits in accounting.

320. **HOSPITALITY INDUSTRY EQUIPMENT AND UTILITIES (3:3:0)** Principles governing the purchase, use and operation of heating, plumbing, refrigeration, air conditioning and other equipment and utilities.

321. **HOSPITALITY INDUSTRY MAINTENANCE (2:2:0)** Maintenance management in hospitality operations.

## **FORESTRY (FOR)**

800. **INTRODUCTION TO FORESTRY (1:0:3)** Introduction to the several branches of forestry through lectures, demonstrations, and field practice.

802. **DENDROLOGY (3:0:9)** Taxonomy of woody plants; their field identification; the geographic distribution of the important forest trees of the United States.

803. **DENDROLOGY (2:0:6)** Continuation of For. 802 with emphasis on the taxonomy of the angiosperms. Prerequisite: For. 802.

804. **FOREST MENSURATION (3:2:3)** Measurement of forests and forest products.

806. **FOREST INVENTORIES (3:2:3)** Application of land surveying and sampling techniques, including statistical analysis, for the determination of timber volume and growth.

807. **FOREST RECREATION (3:2:3)** Development, construction, and management of forest recreation areas and facilities. Prerequisite: C.E. 811.

808. **FOREST PROTECTION (3:2:3)** Forest fire prevention, detection, behavior, and suppression; fire plans and statistics; insect and disease control.

809. **FOREST VALUATION (3:2:3)** Determination of forest values through a consideration of markets, logging and milling costs, stumpage appraisals, and other forest values. Prerequisites: For. 806, 813.

810. **FOREST IMPROVEMENTS (3:2:3)** Use of materials and equipment in developing, operating, and maintaining the forest property.

811. **FOREST PHOTO INTERPRETATION (4:2:6)** Application of aerial photo interpretation techniques by forest technicians in land management. Prerequisites: C.E. 809, 811.

812. **ELEMENTS OF PROJECT SUPERVISION IN FORESTRY (3:3:0)** Supervisory techniques and elements of project layout.

813. **SUMMER FIELD PRACTICE (4)** Concentrated field practice in selected elements of forestry, and introduction to field techniques in watershed, soils, and wildlife management. Prerequisite: For. 806.

814. **FORESTRY LEADERSHIP PRACTICUM (1:0:3)** Leadership techniques applied to standard forestry field operations. Prerequisite or concurrent: For. 812 and two terms of For. 800.

815. **FOREST SURVEYING I (3:2:3)** Basic plane surveying techniques as applied to forestry practices. Prerequisite or concurrent: Math. 801.

816. **FOREST SURVEYING II (3:2:3)** Standard mapping techniques as applied to field forestry situations. Prerequisite: For. 815.

817. **URBAN FORESTRY (3:2:3)** The application of land treatment techniques and forestry practices to urban environments. Prerequisites: For. 802, 807.

818. **INDIVIDUAL STUDIES (1-3 per term)** Individual study of forest technology.

## **GEOGRAPHY (GEOG)**

26. **HUMAN GEOGRAPHY (3:3:0)** Introduction to concepts, principles, and theories of spatial organization.



## **GEOLOGICAL SCIENCES (G SC)**

- \*1. **PHYSICAL GEOLOGY (3:2:3)** Earth processes and their effects on the materials, structure, and morphology of the earth's crust. Practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps.
- \*20. **OUR EARTH (3:2:2)** Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation.
- \*21. **EARTH HISTORY (3:2:2)** Evolution of the earth; changing patterns of mountains, lowlands, and seas; development of living organisms. Practicum includes field trips, studies of geologic maps, geologic problems, fossils.
30. **PHYSICAL AND HISTORICAL GEOLOGY (3:2:3)** Earth structure, processes, origin, and history. Practicum includes field trips, map work, and study of rocks, dynamic models, fossils.

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\*This course includes from one to several field trips for which an additional charge will be made to cover transportation.

## **HEALTH EDUCATION (HL ED)**

303. **EMERGENCY CARE (2:1:2)** Competencies leading to American Red Cross Advanced First Aid and Emergency Care and American Heart Association Cardiopulmonary Resuscitation certification.

## **HISTORY (HIST)**

19. **MODERN EUROPE, 1815 TO THE PRESENT (3:3:0)** Growth of European democracy; scientific progress; Italian and German unification; Industrial Revolution; imperialism; the world wars; search for security and stability; Fascism and Communism.
21. **HISTORY OF THE UNITED STATES SINCE 1865 (3:3:0)** Integrated survey emphasizing the emergence of a dominantly urban-industrial society; expanded role of government; America's increasing involvement in world affairs.
156. (L.S. 156) **HISTORY OF THE AMERICAN WORKER (3:3:0)** A study of the American worker from the preindustrial era to the present.

## **HOTEL AND FOOD SERVICE (H F S)**

802. **SANITATION AND HOUSEKEEPING (3:3:0)** Practical applications of sanitation principles to food service and housing delivery systems; organization and work methods in the housekeeping function.
804. **HOTEL AND FOOD SERVICE MERCHANDISING (3:3:0)** Merchandising as a system distributing benefits, collecting costs, concerned with motivating consumers. Topics include: promotion, menu planning, and research methods.
805. **TRAINING AND SUPERVISION (3:3:0)** Methods and techniques of training and supervising food service and housing employees for overall efficiency of operation.
810. **FOODS EXPERIENCE (4:3:2)** Theory, observation, and practice in food services; emphasis on planning, preparation, and service in commercial food operations.

## **COURSE DESCRIPTIONS**

850. **FOOD SERVICE DELIVERY SYSTEMS (4)** Physical characteristics of principal food product groups considered. Topics include: purchasing problems, preparation techniques, quality and cost control. Prerequisites: Acctg. 101, F.S.H.A. 225.

860. **FOOD SERVICE SUPERVISION (4)** The principal food service administrative routines are considered from the point of view of the supervisor and middle manager. Prerequisite: H.F.S. 850.

870. **FOOD AND BEVERAGE ADMINISTRATION (4)** Components of food service systems are identified and studied as separate problems and as a total system. Prerequisite: H.F.S. 860.

875. **HOSPITAL FOOD OPERATING SYSTEMS (4)** Consideration of hospital food service system as determined by patient needs, physical plant, operating policies, cost constraints and quality standards. Prerequisite: H.F.S. 860.

## **HUMAN DEVELOPMENT (H DEV)**

100. **INTRODUCTION TO HUMAN DEVELOPMENT (1:1:0)** Human development as a process of man-environment transactions, and the relationships of various fields to the study of that process.

200. **EMPIRICAL INQUIRY IN HUMAN DEVELOPMENT (3:3:0)** Introduction to methods and philosophy of empirical inquiry applied to problems of human development.

321. **FIELD PROJECTS (1-12)** Independent study and research in a human service program; written and oral summary of rationale, procedures, findings.

## **HUMANITIES (HUMAN)**

1. **VALUES OF THE WESTERN CULTURAL HERITAGE (3:3:0)** Fundamental values of human experience as expressed in outstanding philosophical and literary works.

2. **SHAPING OF THE MODERN MIND (3:3:0)** Relevance to the present age of influential literary and philosophical texts illustrative of the principal epochs of Western civilization.

21. **IDEAS AND ARTS (3:3:0)** Interaction of intellectual and aesthetic values from the Renaissance to the present.

800. **SOURCES OF MORALITY (3:3:0)** The uses of law and love in man's endeavor to perfect himself.

801. **SCIENCE, TECHNOLOGY, AND HUMAN VALUES (3:3:0)** The effect of science and technology upon man's being, thought, and action.

## **INDIVIDUAL AND FAMILY STUDIES (I F S)**

16. **EFFECTIVE INTERPERSONAL SKILLS (1:1:0)** Training in interaction skills required for the development and maintenance of satisfying interpersonal relationships.

129. **INTRODUCTION TO INDIVIDUAL AND FAMILY DEVELOPMENT (3:3:0)** Introduction to psychosocial and family development at all stages of the individual and family life cycle.

319. **FAMILY FINANCIAL MANAGEMENT (3:3:0)** How families plan their finances and factors that determine their decisions.

329. **INFANCY AND EARLY CHILDHOOD (3:3:0)** Theories, research findings, and methods in social/behavioral/biological sciences related to developmental processes and intervention during infancy/early childhood. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.

## INDUSTRIAL ENGINEERING (I E)

315. **INDUSTRIAL ORGANIZATION AND ADMINISTRATION (3:3:0)** Fundamental principles of organization leading to intelligent appreciation of the simpler problems of factory organization and operation. Students registered in industrial engineering may not schedule this course.

## INDUSTRIAL ENGINEERING TECHNOLOGY (I E)

804. **NOMOGRAPHY (1:0:2)** The preparation of charts and monograms used in the analysis and presentation of engineering and production problems. Prerequisite: Math. 802.

805. **ECONOMICS OF INDUSTRY (2:2:0)** Internal economics of industrial enterprise, cost factors, and methods of comparing alternate proposals.

807. **STATISTICAL QUALITY CONTROL (3:3:0)** The application of this technique to the control of the manufacturing processes and to inspection. Prerequisite: Math. 802.

808. **PLANT LAYOUT (2:0:6)** Arrangement and layout of equipment and processes in an industrial plant for the most economical production. Prerequisites: E.G. 10, I.E. 816.

809. **INSPECTION AND QUALITY CONTROL (3:2:2)** Inspection methods and procedures and their application to control and acceptance sampling based on statistical methods. Prerequisite: E.G. 31.

810. **PRODUCTION LAYOUT AND CONTROL (3:1:6)** Arrangement of equipment and processes in industry and subsequent control of production through stores, routing, scheduling, dispatching, and follow-up techniques. Prerequisite: I.E. 816.

811. **MANUFACTURING MATERIALS AND PROCESSES (3:2:3)** Mechanical properties of materials; primary processing methods used in manufacturing, emphasizing ferrous metals, their relationship to other metals and nonmetals.

812. **MANUFACTURING PROCESSES (3:0:9)** Technology related to metal removal, dimensional inspection, metal joining, hot and cold forming heat treating, metal casting, properties of materials. Prerequisite: I.E. 811.

815. **PRODUCTION DESIGN (3:1:6)** The planning, designing, and specifying of both standard and special tools required for the production of manufactured goods. Prerequisites: E.G. 803, I.E. 812.

816. **METHODS ANALYSIS AND MOTION STUDY (3:1:6)** Construction and use of process charts, primary approach to operation analysis, and principles of motion economy. Prerequisite: I.E. 812.

817. **TIME STUDY AND WAGE PAYMENT (3:1:6)** Fundamentals of time study with instruction in time study practices; application of time studies to incentive wage payment systems. Prerequisite: I.E. 816.

818. **DIGITAL COMPUTER APPLICATIONS (3:2:2)** Application of the digital computer to industrial engineering problems. Prerequisite: Cmp.Sc. 101.

819. **NUMERICAL CONTROL (3:2:2)** Programming point-to-point and continuous path programs for computer-controlled manufacturing processes. Prerequisite: Cmp.Sc. 101.

830. **SELECTED TOPICS IN INDUSTRIAL ENGINEERING TECHNOLOGY (3)** Individual or group work in industrial engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## INSURANCE (INS)

800. **INSURANCE PRINCIPLES (3:3:0)** Introductory survey of all lines of insurance for handling business and personal risks.

## **COURSE DESCRIPTIONS**

810. **LIFE INSURANCE (3:3:0)** The life insurance contracts as methods of treating the problems of premature death and superannuation. Prerequisite: Ins. 800.

820. **PROPERTY AND CASUALTY INSURANCE (3:3:0)** Fundamental principles of property and casualty insurance. Prerequisite: Ins. 800.

830. **INSURANCE PRACTICUM (3:3:0)** Practical introduction to insurer operations in company and agency offices. Prerequisite: Ins. 820.

## **INTERNATIONAL BUSINESS (I B)**

862. **INTERNATIONAL BUSINESS (3:3:0)**

## **JOURNALISM (JOURN)**

800. **HISTORY AND SURVEY OF MASS COMMUNICATIONS (3:3:0)** History and role of mass media and advertising in society; nature of newspaper, magazine, broadcasting, book, and motion picture industries.

801. **BEGINNING NEWS WRITING (3:1:4)** Techniques of news writing with emphasis on organizing the story. Detailed critiques and class discussion of student writing. Prerequisites: Engl. 4, Journ. 800, ability to type.

802. **BEGINNING REPORTING (3:1:4)** The techniques of gathering news; problems of taste, ethics, and legality in reporting the news; community reporting assignments. Prerequisite: Journ. 801.

803. **FUNDAMENTALS OF EDITING (3:1:4)** Techniques of editing material for publication; printing processes; copyreading; headline writing; typography; picture editing; layout; legal and ethical considerations. Prerequisite: Journ. 802.

804. **REPORTING THE COMMUNITY (3:0:9)** Practicum in newspaper reporting, editing, and production. Prerequisite: Journ. 803.

811. **ADVERTISING COPYWRITING (3:1:4)** Techniques of writing advertising headlines and copy, with emphasis on spelling, grammar, and word choice. Detailed critiques of student writing. Prerequisite: Journ. 800.

812. **ADVERTISING LAYOUT (3:1:4)** Print advertisement design and production, including typography, plate making, mat services, shop procedures, etc.; detailed critiques of layouts; field trips. Prerequisite: Journ. 800.

813. **ADVERTISING MEDIA AND CAMPAIGNS (3:1:4)** Media selection and coordination, creative strategy, and campaign execution. Each student plans and produces a complete advertising campaign. Prerequisites: Journ. 811, 812.

814. **NEWSPAPER ADVERTISING (3:0:9)** Management of the newspaper advertising department, advertising sales promotion, preparing the sales presentation, dealing with the advertiser, advertising page make-up. Prerequisite: Journ. 813.

820. **NEWSPAPER MANAGEMENT (3:3:0)** Managing and publishing newspapers in the United States; problems of law, finance, personnel, promotion, technological change, and community service. Prerequisite: Journ. 803 or 813.

## **LABOR STUDIES (L S)**

100. **INDUSTRIAL RELATIONS (3:3:0)** Introductory analysis of the employment relationship and of the interrelated interests of managements, workers, unions, and the public. Prerequisite: fourth-term standing.



## LAW ENFORCEMENT AND CORRECTIONS

102. **STRUCTURE AND FUNCTION OF UNIONS (3:3:0)** A study of the internal structure, goals, and impact on society of unions.
103. **LABOR LEGISLATION (3:3:0)** A study of legislation regulating the functioning of trade unions.
104. **THE PRACTICE OF COLLECTIVE BARGAINING (3:3:0)** A study of the process of collective bargaining, the issues in collective bargaining, and bargaining relationships.
156. (Hist. 156) **HISTORY OF THE AMERICAN WORKER (3:3:0)** A study of the American worker from the preindustrial era to the present.
189. **LABOR STUDIES PROBLEMS (3:3:0)** Individual study of special problems in labor studies. Prerequisite: three courses in labor studies.

## LAW ENFORCEMENT AND CORRECTIONS (L E C)

111. **POLICE AND THE COURTS (3:3:0)** Examines evolution, organization, operation of law enforcement agencies; justice process through conviction, law enforcement interface with other justice system elements.
221. **CORRECTIONAL STRATEGIES (3:3:0)** Examination of the criminal justice system from sentencing through final discharge from correctional supervision, and relationship to pre-conviction system. Prerequisite: L.E.C. 111.
240. **RESEARCH STRATEGIES IN ADMINISTRATION OF JUSTICE (3:3:0)** A survey of the various research strategies relevant to the investigation of research questions in the administration of justice. Prerequisites: H.Dev. 200; Ed.Psy. 300 or Psy. 15 or Stat. 200.
321. **INITIAL FIELD PROJECT IN ADMINISTRATION OF JUSTICE (8:0:16)** Initial placement to be taken prior to seventh-term standing; may be placed in any type administration of justice agency. Prerequisites: Com.D. 7, L.E.C. 111, 221.

## MANAGEMENT (MGMT)

800. **PRINCIPLES OF MANAGEMENT (3:3:0)**
801. **PRINCIPLES OF MANAGEMENT (3:3:0)** Prerequisite: Mgmt. 800.
802. **SUPERVISORY MANAGEMENT (3:3:0)** Preparation for supervisory positions in formal organizations. Emphasis placed on the motivational aspects of the supervisor's job. Prerequisite: Mgmt. 800.

## MAN-ENVIRONMENT RELATIONS (M E R)

213. **PRINCIPLES OF CLOTHING I (2:2:0)** Analysis of aesthetic, functional, and socio-psychological factors related to clothing needs and usage.
214. **PRINCIPLES OF CLOTHING II (2:2:0)** Current cultural influences on the designer, design media, and construction processes in the mass production technology of clothing. Prerequisite: M.E.R. 213.
215. **CLOTHING CONSTRUCTION (1-4)** Experimentation with construction techniques for selected fabrics and design requirements. Prerequisite or concurrent: M.E.R. 213, or consent of instructor.
301. **ELEMENTARY TEXTILES (3:2:2)** Recognition, use, and care of textiles related to characteristics of fibers, yarns, fabric construction, and finishes. Prerequisite: Chem. 11 or Ph.Sc. 8.



## COURSE DESCRIPTIONS

### MARKETING (MKTG)

800. PRINCIPLES OF MARKETING (3:3:0)
801. PRINCIPLES OF MARKETING (3:3:0) Prerequisite: Mktg. 800.
802. PROMOTION MANAGEMENT (3:3:0) The application and management of various forms of persuasive communication with potential customers: personal selling, sales management, advertising, sales promotion. Prerequisite: Mktg. 801.
804. PRINCIPLES OF RETAILING SALESMANSHIP (3:3:0) Principles of selling applied to the retail level of trade; practical application of these principles in various sales situations.
805. RETAILING I (3:3:0) An analysis of the management and merchandising policies of various types of retailing institutions.
806. RETAILING II (3:3:0) Merchandising, promotion, and control policies of retail store management. Prerequisite: Mktg. 805.

### MATERIALS TECHNOLOGY (MAT T)

800. INTRODUCTION TO MATERIALS TECHNOLOGY (4:3:2) Introduction to the nature of inorganic materials, types of manufacturing processes involved, and general characteristics of the products.
801. CHEMISTRY OF MATERIALS (4:3:2) Chemistry of the preparation and blending of raw materials; forming and firing operations and subsequent treatments of the material.
802. PHYSICS OF MATERIALS (4:3:2) Physical changes occurring during firing processes and in subsequent treatment of the materials.
803. MATERIALS TESTING (4:2:4) Applications of testing procedures to determine properties of inorganic materials.
804. SUMMER FIELD PRACTICE (4) Practical experience in the material industries; plant experience with equipment utilized in processing, manufacturing, and testing of inorganic materials.

### MATHEMATICS (MATH)

17. FINITE MATHEMATICS (3:3:0) Introduction to logic, sets, probability.
18. ELEMENTARY LINEAR ALGEBRA (3:3:0) Matrices and vectors; transformations; systems of linear equations; convex sets and linear programming. Prerequisite: 3 units of high school mathematics.
- 35-36. GENERAL VIEW OF MATHEMATICS (3:3:0 each) Discussions revealing past and recent mathematical innovations as extensions of creative thinking within the human endeavor. For the nonmathematically inclined. Prerequisite: seventh-term standing.
800. BUSINESS MATHEMATICS (3:3:0) Review of arithmetic, decimals, fractions, percentages, interest, and discounts; introduction to algebraic techniques; applications to business computations.
- 801-802. TECHNICAL MATHEMATICS (3:3:0 each) Elements of algebra and trigonometry for students in two-year technical programs. Prerequisites: 1 unit in algebra, 1 unit in plane geometry.
803. TECHNICAL CALCULUS (3:3:0) Selected introductory topics from analytic geometry, differential calculus, integral calculus. Prerequisites: Math. 801, 802.

## MECHANICAL ENGINEERING TECHNOLOGY (M E)

800. MECHANISMS (2:0:4) Motion in machine elements; strength and properties of materials; design of machine elements. Prerequisite: E.Mch. 811.
805. KINEMATICS (3:2:3) Graphical and analytical studies of relative motions, instant centers, velocity and acceleration in plane motions, slider crank mechanisms, cams, gears, gear trains, and flexible connectors. Prerequisites: E.G. 1, E.Mch. 811.
807. HEAT TRANSFER (3:3:0) Basic principles of conduction, convection, and radiation, emphasizing practical applications.
810. PRODUCT DESIGN (3:1:6) Design of machine elements including levers, bearings, shafts, clutches, springs, and gears; selection of ball bearings and belts; design of small mechanical devices. Prerequisites: E.Mch. 813, M.E. 805.
830. SELECTED TOPICS IN MECHANICAL ENGINEERING TECHNOLOGY (3) Individual or group work in mechanical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.
880. AIR POLLUTION ANALYSIS INSTRUMENTATION (8) Principles and applications of instruments for measuring particle and gaseous pollutants; theory, installation, operation, maintenance, and related instrumentation. Prerequisite: Math. 803 or one course in college mathematics.
881. ELEMENTARY THERMO AND FLUID DYNAMICS (2:2:0) Basic problems in compressible fluid flow. Laws of dynamics and thermodynamics, mechanical properties of fluids, elementary heat transfer. Prerequisites: Math. 803, Phys. 150.
882. AIR RESOURCE MANAGEMENT (3:3:0) Introduction to air pollution. Pollutants, sources, effects, air monitoring systems, air quality criteria and standards, governmental control programs and procedures.
883. AIR POLLUTION ANALYSIS INSTRUMENTATION (3:2:1) Fundamentals of chemistry, electronics, fluid flow, and small particle technology as applied to air pollution instrumentation. Prerequisites: Chem. 13, Phys. 150.
884. SAMPLING AND MONITORING PROGRAM (2:0:4) Instrumentation and site selection, field data acquisition for major air pollutants, data analysis and evaluation.

## METALLURGY (METAL)

800. METALLURGICAL LABORATORY PRACTICE (4:2:4) Instruction and practice in various metallurgical techniques. Prerequisites: E.G. 10, Math. 802. Prerequisite or concurrent: Phys. 150.
801. FERROUS METALLURGY (3:2:2) Making, shaping, and heat treatment of cast irons and steels. Prerequisites: Chem. 12, Metal. 800.
802. PHYSICAL METALLURGY (3:2:2) Structures of metals and alloys; structure manipulations; structure-property relationships. Prerequisites: Phys. 150, Math. 802, Metal. 800.
803. NONFERROUS METALLURGY (3:2:2) Reduction of nonferrous metals from their ores and subsequent compositional adjustment by refining and alloying. Prerequisites: Chem. 12, Metal. 800.
804. PLANT TRIPS (1:0:3) Plant visits to study industrial ferrous and nonferrous metallurgical operations. Spring term, odd years.
805. METALLURGICAL OPERATIONS (1:0:2) Classroom discussion by local metallurgists pertaining to their work and the role of the metallurgical associate in their operations. Spring term, even years.

## **COURSE DESCRIPTIONS**

### **METEOROLOGY (METEO)**

303. **INTRODUCTORY METEOROLOGY (3:2:2)** Nontechnical treatment of fundamentals of modern meteorology; effect of weather and climate on man and his activities. A student who took Meteo. 300 or 304 may take this course for 1 credit only.

### **MICROBIOLOGY (MICRB)**

1. **INTRODUCTORY MICROBIOLOGY (2:2:2)** Elementary principles of bacterial morphology and physiology; relation of microorganisms to fermentation, disease, food, dairy products, water purification, sewage disposal, and soil fertility. Prerequisite: Chem. 12.

2. **INTRODUCTORY MICROBIOLOGY LABORATORY (2:0:4)** Qualitative and quantitative techniques with regard to recognition of bacteria and their processes on a microscopic, colonial, and physiological basis. Prerequisite or concurrent: Micrb. 1. Prerequisite: Chem. 12.

6. **ELEMENTARY MICROBIOLOGY (2:2:0)** Importance of microorganisms in public health and disease, agriculture and industry; descriptive course for nontechnical students.

7. **ELEMENTARY MICROBIOLOGY LABORATORY (1:0:2)** Selected techniques with regard to recognition and enumeration of bacteria; effects of chemical and physical agents on microorganisms. Prerequisite or concurrent: Micrb. 6.

101. **MEDICAL MICROBIOLOGY FOR MEDICAL LABORATORY TECHNICIANS (5:3:4)** Procedures and techniques used to isolate and diagnose clinically significant organisms such as bacteria, fungi, and other human parasites. Prerequisites: Micrb. 1 and 2.

102. **HEMATOLOGY FOR MEDICAL LABORATORY TECHNICIANS (5:3:4)** Theoretical and practical aspects of hematological diagnostic studies related to erythrocyte and leukocyte disorders in man.

801. **CLINICAL LABORATORY ORIENTATION FOR MEDICAL LABORATORY TECHNICIANS (6:3:6)** Introduction to basic principles of clinical laboratory work, including the collection, handling, and preparation of biological samples.

### **MINERAL ENGINEERING (MIN E)**

61. (Metal. 61) **INTRODUCTION TO COAL PREPARATION (3:3:0)** Theory and application of modern coal preparation practice. Sampling, crushing, sizing, gravity concentration, flotation, dewatering, drying; pollution control; flowsheets.

### **MINING (MNG)**

23. **MINERAL LAND AND MINE SURVEYING (3:0:9)** Surveying theory and practice applied to mineral lands and mines; traversing, leveling, mapping, shaft plumbing; stope, room, and development surveying. Prerequisite: E.G. 11.

30. **INTRODUCTION TO MINING ENGINEERING (3:2:3)** Examination, development, and exploitation of mineral deposits in case studies of mineral deposits and mines; unit operations, cycling, equipment, methods.

## MINING TECHNOLOGY (MNG T)

800. MINING TECHNOLOGY ORIENTATION (1:0:2) Films, slides, and lectures to acquaint the student with the coal mining industry and its impact on society.
801. COAL MINING TECHNOLOGY (3:2:3) Analysis of coal mining systems; integration of unit operations and mining methods for efficient mine production. Prerequisite: Mng.T. 800.
802. MINE VENTILATION (3:2:3) Quality and quantity analysis and control of mine atmosphere. Prerequisite or concurrent: Chem. 11, Phys. 150.
803. STRATA CONTROL (3:2:3) Fundamentals of stresses and strains in rocks; virgin and concentrated stresses; roof support, subsidence, bursts, and stability control. Prerequisite or concurrent: Mng.T. 801.
804. MINE PLANT TECHNOLOGY (3:2:3) Electrical systems in mines; mechanical power applications and materials handling systems. Prerequisite: Phys. 150.
805. MINE SYSTEMS TECHNOLOGY (3:2:3) Quantitative methods of work measurement and their application to production and method study problems related to mines. Prerequisite: Mng.T. 801.
806. MINE MANAGEMENT AND LAW (3:3:0) The problems of the individual in coal mine management in relation to environment, employer, union, and law. Prerequisite: Econ. 14.
807. ELECTRICAL MINE MACHINE CIRCUITS (3:2:3) Topics of electrical power fundamentals, power and control circuits, and motors and their mine applications will be covered. Prerequisite: Mng.T. 804.
808. MINE POWER DISTRIBUTION (3:2:3) Topics of high voltage circuits, underground transmission, power stations, power conversion, safety regulations and power devices will be covered. Prerequisite: Mng.T. 804.
809. MINE MACHINERY HYDRAULICS (3:2:3) Topics of basic hydraulic principles and their application to mining and mine machinery will be covered. Prerequisites: Math. 802, Phys. 150.
810. MINE MACHINE DYNAMICS (3:2:3) Topics on basic machines and their application to the principles of mine machine operation will be covered. Prerequisites: E.Mch. 811, Phys. 150.
811. PRACTICUM IN MINE MAINTENANCE (3:0:9) Field and shop techniques in procedures of electrical, mechanical and hydraulic phases of mine maintenance will be covered. Prerequisites: Mng.T. 804, Phys. 150.

## MUSIC (MUSIC)

5. THE FUNDAMENTALS OF MUSIC APPRECIATION (3:3:0) Recitation and lectures with recorded examples of melody, harmony, rhythm, vocal and instrumental timbre, form, and program and absolute music.

## MUSIC EDUCATION (MU ED)

806. MUSIC SKILLS FOR RECREATION LEADERS (3:3:0) Theories and practice in music activities found in group and club settings. Appreciation, leadership techniques, and fundamental musicology.



## COURSE DESCRIPTIONS

### NUCLEAR ENGINEERING TECHNOLOGY (NUC E)

800. NUCLEAR AND ATOMIC SCIENCE (2:2:0) Introduction to the theories of atomic and nuclear structure and electromagnetic radiation. Prerequisites: Phys. 151, Math. 803.
801. RADIOLOGICAL SAFETY (2:2:0) Discussion of basic radiation dose units, radiation monitoring techniques, biological effects of radiation, and AEC regulations. Prerequisite or concurrent: Nuc.E. 800.
802. ELEMENTS OF NUCLEAR TECHNOLOGY (2:2:0) Study of nuclear radiations, nuclear interactions, neutron diffusion, and reactor materials. Prerequisite: Nuc.E. 800.
803. ELEMENTS OF NUCLEAR POWER GENERATION (3:3:0) Survey of various reactor types with emphasis on fuel heat removal and power generation, shielding, fuel fabrication and reprocessing. Prerequisite: Nuc.E. 802.
804. INTRODUCTION TO REACTOR TECHNOLOGY (3:3:0) Steady state reactor theory, kinetic behavior of reactors and reactor control systems. Prerequisite: Nuc.E. 802.
805. PRINCIPLES OF MEASUREMENT (3:2:2) A study of measurement in the nuclear industry, including the instruments used, accuracy of measurement, and statistical justification. Prerequisites: E.E. 814, Phys. 151.
812. NUCLEAR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of radiation measurements and the diversified application of nuclear techniques. Prerequisites: Nuc.E. 801, 802.
814. REACTOR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of basic reactor experiments, control rod calibration, critical experiment, etc. Emphasis placed upon reactor operations. Must be taken with Nuc.E. 804. Prerequisite: Nuc.E. 801.
830. SELECTED TOPICS IN NUCLEAR ENGINEERING TECHNOLOGY (3) Individual or group work in nuclear engineering technology for students with specific occupational objectives. Prerequisite: fourth-term standing.

### NURSING (NURS)

800. FOUNDATIONS OF TECHNICAL NURSING I (6:4:8) Role of the nurse in society and the health care team; nursing techniques used to meet basic patient needs.
801. FOUNDATIONS OF TECHNICAL NURSING II (6:4:8) Nursing techniques utilized to meet the needs of the patient undergoing diagnosis or basic medical or surgical treatment. Prerequisites or concurrent: Biol. 29, 41, Microb. 6, Nurs. 800.
802. TECHNIQUES OF NURSING IN CHILDHOOD (7:3:16) Application of nursing techniques to the health needs of persons in the 2-week-old to 19-year-old age group. Prerequisite: Nurs. 801.
803. TECHNIQUES OF NURSING THE MATURE PATIENT (7:3:16) Application of nursing techniques to the health needs of persons in the 20-year-old to 40-year-old age group. Prerequisite: Nurs. 801.
804. TECHNIQUES OF NURSING THE PATIENT IN THE MIDDLE YEARS (7:3:16) Utilization of nursing techniques to meet the health needs of persons in the 41-year-old to 65-year-old age group. Prerequisite: Nurs. 801.
805. TECHNIQUES OF NURSING THE PATIENT IN SENESCENCE (7:3:16) Application of nursing techniques to meet the health needs of persons over 65 years of age. Prerequisite: Nurs. 801.
806. NURSING SEMINAR (3:3:0) Current issues in nursing, and adjustments of the student to the role of the graduate technical nurse. Prerequisite or concurrent: Nurs. 801.



**NUTRITION (NUTR)**

150. **ELEMENTARY NUTRITION (2:2:0)** Fundamentals of nutrition and its relation to human health. Students who have passed Nutr. 351 may not schedule this course.

351. **INTRODUCTORY PRINCIPLES OF NUTRITION (3:3:0)** The nutrients; food sources and physiological functions as related to human growth and well-being throughout life; current nutrition issues. Students who have passed Nutr. 150 may not schedule this course.

800. **NORMAL DIET MODIFICATION (4:3:3)** Modifications of normal diet to meet therapeutic needs in patient care and rehabilitation.

**PHILOSOPHY (PHIL)**

1. **INTRODUCTION TO LOGIC (3:3:0)** Principles of correct thinking; deductive and inductive inference; use and misuse of language in reasoning.

2. **INTRODUCTION TO PHILOSOPHY (3:3:0)** Evaluation of the intellectual and moral tone of the present day through a study of existentialism and other recent philosophies. Prerequisite: fourth-term standing.

4. **BASIC PROBLEMS OF PHILOSOPHY (3:3:0)** How important philosophers have treated the perennial problems of knowledge, reality, free will, etc.

12. **ELEMENTS OF SYMBOLIC LOGIC (3:3:0)** How to translate arguments into symbolic language and test them for validity using truth-tables and deduction rules. For nonscience majors.

212. **SYMBOLIC LOGIC (3:3:0)** The logic of classes, propositions, relations, and quantification; the nature and properties of formal systems. Intended primarily for science-oriented students. Prerequisite: fourth-term standing.

**PHYSICAL EDUCATION (PH ED)**

\*5. **PHYSICAL EDUCATION (1:0:3 per term)** Activities to develop physical and recreational skills; beginning swimming required of those who fail swim-safety test. Selection from archery, badminton, bowling, canoeing, casting, dancing, fencing, field hockey, figure skating, golf, gymnastics, handball, hunter safety, personal defense, riflery, sailing, scuba, soccer, squash, swimming, tennis, volleyball, weight training, and others. Typically, two activities per term.

801. **LIFETIME SPORTS (1:0:3)** Basic understanding of the fundamentals of lifetime sports and the leadership and supervision of such sports.

802. **SWIMMING (1:0:3)** Fundamentals of swimming and the supervision of aquatic facility programs.

803. **GAMES FOR CHILDREN (1:0:3)** Low organized and lead-up games with emphasis on age group differences.

804. **DANCE AND GYMNASTICS (1:0:3)** Understanding dance forms and rudiments of gymnastics.

805. **TEAM SPORTS (1:0:3)** Basic understanding of the fundamentals of team sports, and the leadership and supervision of such sports.

806. **OFFICIATING (1:0:3)** Theory and practice of officiating games and sports.

807. **ADAPTED ACTIVITIES (1:0:3)** Adaptation of activities and methods of presentation of games for the handicapped.

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\*Must be repeated for a total of 3 credits to satisfy University Baccalaureate Degree Requirements.

## **COURSE DESCRIPTIONS**

### **PHYSICAL SCIENCE (PH SC)**

7. **PHYSICAL SCIENCE (3:3:0)** Development of physics, including modern physical concepts and their relationship to the careers of physical scientists. May not be scheduled by students who have received credit for Phys. 201 or 215.
8. **PHYSICAL SCIENCE (3:3:0)** Selected concepts of chemistry showing their development, interrelationship, and present status. May not be scheduled by students who have received credit for Chem. 11 or 12.

### **PHYSICS (PHYS)**

150. **TECHNICAL PHYSICS (3:2:2)** Elementary treatment of topics in mechanics, heat, wave motion, and sound leading toward an understanding of technical applications. Prerequisite: 1½ units of algebra. Prerequisite or concurrent: Math. 801.
151. **TECHNICAL PHYSICS (3:2:2)** Elementary treatment of topics in electricity, light, and modern physics leading toward an understanding of technical applications. Prerequisite: Phys. 150.
215. **INTRODUCTORY PHYSICS (4:3:2)** Selected topics in mechanics, heat, and sound. Prerequisite: algebra to quadratics.
265. **INTRODUCTORY PHYSICS (4:3:2)** Selected topics in light, electricity, and magnetism. Prerequisite: Phys. 215.

### **PLANT SCIENCE (PLTSC)**

800. **FIELD AND FORAGE CROP PRODUCTION (3:2:2)** Production of field crops and pastures; management practices in relation to crop species; soil adaptation for desired yield and use.
801. **PRODUCTION OF HORTICULTURAL CROPS (3:2:2)** The application of scientific principles to horticultural crop production.
802. **USE OF AGRICULTURAL CHEMICALS (3:2:2)** Principles and practices relating to safe and effective control of weeds, insects, and plant diseases through use of chemical toxicants.

### **POLITICAL SCIENCE (PL SC)**

1. **AMERICAN NATIONAL GOVERNMENT (3:3:0)** Development and nature of American political culture; constitutional and structural arrangements; policy-making processes; sources of conflict and consensus.

### **PSYCHOLOGY (PSY)**

2. **PSYCHOLOGY (3:3:0)** Introduction to general psychology; principles of human behavior and their applications.
13. **INTRODUCTION TO DEVELOPMENTAL PSYCHOLOGY (3:3:0)** Developmental principles; physical growth; linguistic, intellectual, emotional, and social development from infancy to maturity. Prerequisite: Psy. 2.
37. **MENTAL HEALTH (3:3:0)** Maintaining adjustment, developing a well-balanced personality; behavior disorders and their treatment. May not be used as prerequisite for any course in psychology. Not open to psychology majors or those who have credit for Psy. 437.

## QUANTITATIVE BUSINESS ANALYSIS (Q B A)

101. ELEMENTARY BUSINESS STATISTICS (3:3:0) Introduction to methods of collection, presentation, and analysis of economic and business data.

102. ELEMENTARY BUSINESS STATISTICS (3:3:0) Methods of isolating trend, seasonal and cyclical, simple linear and multiple correlation, analysis of variance, applications of statistical techniques to economic and business problems. Prerequisite: Q.B.A. 101.

801. ELEMENTARY BUSINESS STATISTICS (3:3:0) Collection, tabulation, measurement, presentation, and interpretation of quantitative material. Prerequisite: fourth-term standing.

## REAL ESTATE (R EST)

800. REAL ESTATE PRINCIPLES (3:3:0) Nature of the real estate market; introduction to the functions performed in the real estate business.

810. REAL ESTATE SALES (3:3:0) Principles underlying the sale of real estate; the use of selling tools and procedures in the analysis of customers' needs.

830. REAL ESTATE FINANCE (3:3:0) Basic principles of real estate finance; sources of funds for financing real estate.

## RECREATION AND PARKS (RC PK)

120. MAN AND LEISURE (3:3:0) Introduction to leisure in historical and contemporary perspective. Relationships between leisure and other social institutions. Determinants of leisure behavior.

130. OUTDOOR LIVING SKILLS (1:0:3) Direct experience with outdoor living skills and backpacking; weekend campout. American Camping Association's Advanced Campcraft certification skills covered. Prerequisite: American Red Cross Standard First Aid and Personal Care certificate recommended.

150. THE SCOPE OF RECREATION AND PARKS SERVICES (1) Observation of and exposure to components, programs, and agencies which make up the field of recreation and parks services.

190. THE ROLE OF THE RECREATION AND PARKS PROFESSIONAL (1:1:0) Orientation to role of recreation and parks professionals in providing leisure services in various settings and through diverse agencies. Prerequisite: Rc.Pk. 120.

230. CAMP COUNSELING (2:1:2) Counselor skills and responsibilities for the organized camp.

236. THEORY AND PRACTICE OF RECREATION LEADERSHIP (3:2:2) Methods and materials; experience in recreation leadership with different age groups and in a variety of school and community settings.

850. FIELD PRACTICUM (3) Observation and participation in a recreation system, hospital, youth-serving agency, or other setting.

856. RECREATION PROGRAM PLANNING (3:3:0) The theory and exploration of program planning in the various recreation settings. Policies and philosophies pertinent to the program areas.

875. INTRODUCTION TO THERAPEUTIC RECREATION (3:3:0) Recreation for the mentally retarded, physically handicapped, emotionally disturbed, the aged, and the culturally different in institutions and community settings.

877. THERAPEUTIC RECREATION PROGRAM (3:3:0) Critical examination of therapeutic recreation leader's role in relation to other human services, activity analysis and counseling techniques. Prerequisite: Rc.Pk. 875.



## **COURSE DESCRIPTIONS**

### **RETAILING (RTL)**

833. **SELECTION AND USE OF TEXTILES (3:2:4)** Selection, use, and care of textile products as affected by fiber, yarn, and fabric construction, and finishing processes.

834. **FORCES OPERATING IN THE CLOTHING AND TEXTILE INDUSTRY (2:2:0)** Description of ways in which operations of the various segments of the clothing and textiles industry impinge on retailing. Prerequisites: Mktg. 804, 805, 806.

840. **MANAGEMENT IN THE HOME (3:3:0)** The principles of decision making, work simplification, use of equipment, and home safety applied to family management.

850. **DISPLAY TECHNIQUES (2:1:3)** Display as visual communication, emphasizing the techniques related to merchandising and art. Prerequisite: an art or art appreciation course.

### **SOCIAL SCIENCE (SO SC)**

1. **THE URBANIZATION OF MAN: A SOCIAL SCIENCE PERSPECTIVE (3:3:0)** An overview of the social sciences, including an interdisciplinary analysis of the urban process.

2. **CONTEMPORARY MAN AND SOCIETY (3:3:0)** Selected contemporary issues in the perspective of history, sociology, psychology, economics, and political science.

### **SOCIAL STUDIES (SO ST)**

800. **HUMAN CULTURES AND THE INDIVIDUAL (3:3:0)** Basic components of human cultures, with emphasis upon specific elements of American culture.

801. **CRITICAL AND VISIONARY CONCEPTS OF SOCIETY (3:3:0)** Critical and visionary concepts of society from the Renaissance to the present, including major theorists, commentators, and imaginative writers.

### **SOCIOLOGY (SOC)**

1. **INTRODUCTORY SOCIOLOGY (3:3:0)** Social structure; basic human institutions; analysis of social processes; major social forces.

3. **INTRODUCTORY SOCIAL PSYCHOLOGY (3:3:0)** Culture, conduct, and the sociogenesis of behavior. Prerequisite: 3 credits in sociology or psychology.

5. **SOCIAL PROBLEMS (3:3:0)** Poverty, delinquency, crime; family discord; industrial, race, and nationality conflicts; mental disorders. Prerequisite: fourth-term standing.

7. **METHODOLOGY OF SOCIOLOGY (3:3:0)** Introduction to the nature, collection, and interpretation of materials used by social scientists in research and publication. Prerequisite: 3 credits in sociology or anthropology.

### **SPEECH COMMUNICATION (SPCOM)**

200. **EFFECTIVE SPEECH (3:3:0)** Introduction to situational adaptation through speech: formal speaking, small-group problem solving, interpretation and evaluation of oral messages. (Fourth-term standing advised.)

801. **RADIO AND SOCIETY (3:3:0)** Development of radio broadcasting in America; its organization, control, and regulations; sociological, economic, and cultural effects.

802. **INTRODUCTORY RADIO PROGRAMMING AND PERFORMANCE (3:1:4)** Development, writing, and performance of simple radio programs, including proper performance, microphone technique, and presence.

803. **ADVANCED RADIO PROGRAMMING AND PERFORMANCE (3:1:4)** Preparation and performance of radio programs with cultural and public affairs emphasis and the preparation of commercials for local clients. Prerequisite: Sp.Com. 802.

804. **BUSINESS ASPECTS OF RADIO BROADCASTING (3:3:0)** Organization of radio broadcasting at the local level, covering the aspects of purpose, budget, sales, promotion, and public relations. Prerequisite: Sp.Com. 801.

## STATISTICS (STAT)

200. **ELEMENTARY STATISTICS (4:3:2)** Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. Prerequisite: 2 units in algebra.

## THEATRE ARTS (THEA)

104. **PROCESSES OF THEATRE PRODUCTION (3:1:4)** The procedures of design, coordination, and execution of scenery, costumes, lighting, and sound for nonprofessional productions.

806. **INTRODUCTION TO CREATIVE DRAMATICS (3:1:4)** Introduction and direct experience in creative dramatics and survey of children's theatre.

## WILDLIFE (WIDL)

801. **INTRODUCTION TO WILDLIFE MANAGEMENT (3:3:0)** Basic principles of wildlife management. Introduction to general ecology and wildlife population dynamics.

803. **ANIMAL IDENTIFICATION (3:2:3)** Identification of mammals, birds, reptiles, amphibians and fishes; introduction to their life histories.

804. **WILDLIFE MENSURATION (3:2:3)** The measurement of animal populations and vegetation samples.

805. **FIELD AND LABORATORY TECHNIQUES (3:1:6)** Techniques utilized in wildlife research and management; introduction to mapping, photography, census, record keeping and measurement of population structure. Prerequisites: For. 802, Wildl. 801, 803, 804, 812, 814. Concurrent: Wildl. 806.

806. **OPERATIONAL PROCEDURES AND EQUIPMENT (2:1:3)** Summer camp for operational procedures and the operation and maintenance of wildlife equipment and facilities. Concurrent: Wildl. 805.

807. **OUTDOOR RECREATION (3:2:3)** Sociology, history, and economics of recreational demand; recreational areas and management procedures.

809. **ANIMAL CARE (3:2:3)** Care and handling of captive wild animals.

811. **AERIAL PHOTO INTERPRETATION (4:2:6)** Techniques of photo interpretation; type mapping of wildlife environments; photo censusing of wild animals.

812. **WILDLIFE FIELD SURVEYS (3:2:3)** Terrestrial measurement, methods of plotting, area determinations, cover, and type mapping.

813. **FISHERIES MANAGEMENT FOR TECHNICIANS (3:2:3)** Introduction to fisheries management, biology of fishes, aquatic ecology, use and care of equipment, habitat surveys, and management practices.

814. **HABITAT MANAGEMENT (3:0:9)** Identification, ecological characteristics, manipulation of food and cover plants. Animal needs, range and habitat analysis, and management for wildlife.



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201 SHIELDS BUILDING  
THE PENNSYLVANIA STATE UNIVERSITY  
UNIVERSITY PARK, PA 16802

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16801

**1978-1979**

**The Pennsylvania State  
University Bulletin**

**Associate Degree Programs**



**1978-1979**

# **THE PENNSYLVANIA STATE UNIVERSITY BULLETIN**

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## **ASSOCIATE DEGREE PROGRAMS**

### **REGULATIONS SUBJECT TO CHANGE**

The educational process necessitates change. This bulletin must be considered as informational and not binding on the University.

Each step of the educational process, from admission through graduation, requires continuing review and appropriate approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.



# MAJORS AND CAMPUS LOCATIONS

## BACCALAUREATE DEGREE MAJORS

The first two years of nearly all baccalaureate majors are offered at all campuses. Exceptions are baccalaureate majors in Architecture and Landscape Architecture, to which students are admitted only at the University Park Campus.

	LOCATIONS	ALLENTOWN	ALTOONA	BEAVER	†BEHREND COLLEGE	BERKS	DELAWARE COUNTY	DUBOIS	FAYETTE	HAZLETON	MCKEESPORT	MONT ALTO	NEW KENSINGTON	OGONTZ	SCHUYLKILL	SHENANGO VALLEY	**UNIVERSITY PARK	WILKES-BARRE	WORTHINGTON	SCRANTON	YORK
<b>ASSOCIATE DEGREE MAJORS</b>																					
Agricultural Business (1st yr. only)		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Agricultural Business (2nd yr. only)		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Air Pollution Control Engr. Tech. (1st yr.)		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Air Pollution Control Engr. Tech. (1st & 2nd yr.)					•																
Architectural Engineering Technology									•							•				•	
Biomedical Equipment Tech. (1st yr.)		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Biomedical Equipment Tech. (1st & 2nd yr.)																		•			
Business Administration			•	•	•	•	•	•	•				•		•	•				•	
Chemical Engineering Technology					•																
Community Services*					•	•															
(Administration of Justice)																					
Computer Science			•										•		•					•	•
Electrical Engineering Technology		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Forest Technology												•									
Highway Engineering Technology																			•		
Hotel and Food Service					•																
Labor Studies*					•	•														•	
Letters, Arts, and Sciences*		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Mass Communications — Broadcasting																			•		
Mass Communications — Journalism						•										•					
Mechanical Engineering Technology		•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
(Drafting and Design Technology)																					
Medical Laboratory Technology									•												
Mining Technology		•							•												
Nuclear Engineering Tech. (1st yr.)		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Nuclear Engineering Tech. (1st & 2nd yr.)		•							•												
Nursing				•																	
Recreation and Parks												•	•								
Retailing		•																			
Sociology*						•		•							•	•					
Steel Technology															•						
Surveying Technology										•							•				
Wildlife Technology						•															

\*Community Services (Administration of Justice), Labor Studies, and Sociology are offered as *extended degree programs* for students wishing to pursue part-time (day or evening) study. Letters, Arts, and Sciences may also be taken as an extended degree program at all University locations. Interested students should write to the Undergraduate Admissions Office or the nearest Commonwealth Campus to request a special application form for extended degree programs.

†Four years of some baccalaureate degree majors.

\*\*Four years of all baccalaureate degree majors.

## **PENN STATE COMMONWEALTH CAMPUSES**

**\*UNIVERSITY PARK CAMPUS** University Park, PA 16802  
Area Code 814 865-4700

**ALLENTOWN CAMPUS** Fogelsville, PA 18051  
Area Code 215 395-6851

**ALTOONA CAMPUS** Smith Building, Altoona, PA 16603  
Area Code 814 944-4547

**BEAVER CAMPUS** Brodhead Road, Monaca, PA 15061  
Area Code 412 775-8830

**\*BEHREND COLLEGE** Erie (Station Rd., Wesleyville), PA 16510  
Area Code 814 898-1511

**BERKS CAMPUS** R.D. 5, Tulpehocken Road, P.O. Box 2150,  
Reading, PA 19608  
Area Code 215 375-4211

**\*CAPITOL CAMPUS** Middletown, PA 17057  
Area Code 717 787-7734

**DELAWARE COUNTY CAMPUS** 25 Yearsley Mill Road, Media, PA 19063  
Area Code 215 565-3300

**DuBOIS CAMPUS** College Place, DuBois, PA 15801  
Area Code 814 371-2800

**FAYETTE CAMPUS** P.O. Box 519, Uniontown, PA 15410  
Area Code 412 437-2801

**HAZLETON CAMPUS** Highacres, Hazleton, PA 18201  
Area Code 717 454-8731

**McKEESPORT CAMPUS** University Drive, McKeesport, PA 15132  
Area Code 412 678-9501  
Area Code 412 462-6401

**MONT ALTO CAMPUS** Mont Alto, PA 17237  
(Waynesboro) Area Code 717 749-3111

**NEW KENSINGTON CAMPUS** 3550 7th Street Rd.,  
New Kensington, PA 15068  
Area Code 412 339-1031

**OGONTZ CAMPUS** 1600 Woodland Road, Abington, PA 19001  
Area Code 215 886-9400

**SCHUYLKILL CAMPUS** State Highway, Schuylkill Haven, PA 17972  
Area Code 717 385-4500

**SHENANGO VALLEY CAMPUS** Shenango and Reno Streets,  
Sharon, PA 16146  
Area Code 412 981-1640

**WILKES-BARRE CAMPUS** P.O. Box 1830, Wilkes-Barre, PA 18708  
Area Code 717 675-2171

**WORTHINGTON SCRANTON CAMPUS** 120 Ridge View Drive,  
Dunmore, PA 18512  
Area Code 717 961-4757

**YORK CAMPUS** 1031 Edgecomb Ave., York, PA 17403  
Area Code 717 854-3632

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\*Upper-division and graduate courses

**THE PENNSYLVANIA STATE UNIVERSITY BULLETIN**

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## \*UNIVERSITY CALENDAR

### WINTER TERM 1978

#### DECEMBER

- 1 Thursday — Classes begin 8:00 a.m.
- 20 Tuesday — Christmas and New Year's recess begins 9:55 p.m.

#### JANUARY 1978

- 4 Monday — Winter term classes resume 8:00 a.m.

#### FEBRUARY

- 22 Wednesday — Classes end 9:55 p.m.

### SPRING TERM 1978

#### MARCH

- 9 Thursday — Classes begin 8:00 a.m.

#### MAY

- 17 Wednesday — Classes end 9:55 p.m.

### SUMMER TERM 1978

#### JUNE

- 12 Monday — Classes begin 8:00 a.m.

#### JULY

- 4 +Tuesday — Independence Day recess (no classes)

#### AUGUST

- 21 +Monday — Classes end 9:55 p.m.

### FALL TERM 1978

#### SEPTEMBER

- 5 Tuesday — Classes begin 8:00 a.m.

#### NOVEMBER

- 13 Monday — Classes end 9:55 p.m.

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\*This calendar is subject to change without notice. Although the University makes every effort to avoid conflicts with religious holidays in preparing the calendar for an academic year, such conflicts are sometimes unavoidable. When they occur, efforts are made to make special arrangements for the students affected.

Tuesday, July 4, 1978, classes will meet according to schedule on Monday, August 21, 1978.

# UNIVERSITY ADMINISTRATION

JOHN W. OSWALD, A.B., Ph.D., LL.D., D.Sc., D.H.L. *President*

## GENERAL AND STAFF OFFICERS

EDWARD D. EDDY, B.S., M.Th., Ph.D., LL.D., Litt.D., D.H.L. *Provost of the University*  
STANLEY O. IKENBERRY, B.A., M.A., Ph.D. *Sr. Vice Pres. for University Development and Relations*  
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## TWO-YEAR ASSOCIATE DEGREE MAJORS

The two-year associate degree majors provide concentrated instruction to prepare graduates for specialized assignments in business and industry or to give students a basic two-year education. These majors are offered at Commonwealth Campus locations as listed on page 2 of this bulletin. In addition, the Commonwealth Campuses offer up to two years of work in most of the baccalaureate degree majors offered by the University.

At present the University offers two-year majors in Agricultural Business; Business Administration; Community Services; Computer Science; Forest Technology; Hotel and Food Service; Labor Studies; Letters, Arts, and Sciences; Mass Communications—Broadcasting; Mass Communications—Journalism; Medical Laboratory Technology; Nursing; Recreation and Parks; Retailing; Sociology; Wildlife Technology; and eleven areas of engineering: Air Pollution Control Engineering Technology; Architectural Engineering Technology; Biomedical Equipment Technology; Chemical Engineering Technology; Electrical Engineering Technology; Highway Engineering Technology; Mechanical Engineering Technology; Mining Technology; Nuclear Engineering Technology; Steel Technology; and Surveying Technology.

A description of the purposes, objectives, and content of each of the two-year majors is given on succeeding pages.

Most of Penn State's associate degree enrollment at present is concentrated in its engineering technology majors. The engineering technology graduate, a specialist in applied rather than theoretical engineering, is equipped to translate creative ideas into new machines, products, structures, and processes. He or she understands the basic scientific principles which are the tools of the graduate engineer and is acquainted with the production tools and materials of this skilled worker.

**STATEMENT OF BASIC ACADEMIC ADMISSIONS POLICIES**—Admission to University credit courses or degree candidacy at The Pennsylvania State University is governed by policies established by the University Faculty Senate. Although specific applications of these policies may vary from year to year, from location to location, and from program to program, all University admissions are governed by the following general policies:

1. As an institution of higher education, The Pennsylvania State University is committed to making post-high school education available to all who possess a high school diploma or its equivalent without restriction as to race, sex, religion, color, ancestry, age, or national origin.
2. The primary responsibility of the University is to residents of the Commonwealth of Pennsylvania. Consequently, within limits expressed from time to time by the Board of Trustees of the University, preference shall be given to Pennsylvania residents in the various admission processes.
3. In order to meet the variety of goals and objectives of the population, the spectrum of offerings is designed to enable persons with a variety of objectives — both degree and nondegree — to receive higher education. Although access to educational opportunities of the University is open to all, courses offered for credit are available to those holding a high school diploma or its equivalent. Policies governing admission to degree candidacy are established by the University Faculty Senate (with delegation of policies governing admissions to graduate programs to the Graduate Faculty of the University) under a general policy of offering admissions to those whose past academic performance indicates a reasonable probability of success.
4. Students are admitted to undergraduate degree candidacy in four categories: freshman (1) baccalaureate and (2) associate degree candidacy; advanced standing (3) baccalaureate and (4) associate degree candidacy. To be admitted to undergraduate degree candidacy through one of these four categories, the individual must present an academic performance record which indicates a reasonable probability of success in his or her chosen program. In the case of



## TWO-YEAR ASSOCIATE DEGREE MAJORS

freshman admission to undergraduate degree candidacy, performance is measured through the high school record and standardized test results. In the case of advanced standing admission, performance is measured either through success in nondegree programs and courses of the University or by success at some other institution of higher education.

5. Within the space available in particular programs and at particular locations, admissions shall be offered preferentially to those whose performance record indicates the highest probability of success in the chosen program — with this process continuing until all available spaces are filled. Although exceptions to this policy may be made from time to time (for example, recipients of scholarships with restricting qualifications), these exceptions may be made only for students who meet at least the minimum admission and entrance requirements.

6. To assure a proper educational mix of students and to further broaden the educational opportunities offered by the University, the University Faculty Senate and the University administration may from time to time authorize various specialized programs. These programs may permit students who do not meet the basic qualifications for admission to degree candidacy to be admitted to such candidacy. These programs may also permit, in selected situations, exceptional students who have not earned a high school diploma or its equivalent to enroll in university credit courses. Such specialized programs may include up to 10 percent of the total admission group for the University in any one year and up to a maximum of 15 percent of the admission to any geographic location of the University.

7. Within this general policy, colleges of the University, with the concurrence of the University Faculty Senate, may impose certain educational background requirements (Carnegie Units) which must be completed by an individual before being admitted to degree candidacy.

**ADMISSION REQUIREMENTS—*Freshman Admission*** — A person who holds a high school diploma or its equivalent, and who has not taken credit courses at an institution of higher learning, or a person who holds a high school diploma or its equivalent and who has taken less than 18 semester credits at an accredited college or university may be considered for admission as a freshman.

Applicants for admission to all associate degree programs must submit scores of the Scholastic Aptitude Test of the College Entrance Examination Board.

All applications should be addressed to the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802. Telephone: (814) 865-5471.

The University reserves the right to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

An applicant must state in writing whether he has attended any other institution of higher learning, even though advanced standing is not desired. Failure to indicate, at the time of registration, previous registration in another institution invalidates the admission.

To be admitted to degree candidacy, the applicant must have completed certain education background requirements, called Carnegie Units or secondary school units. To determine whether you have the appropriate secondary school units required for your choice of a program of study, refer to the following page to the program of your choice. Then read across to determine the necessary units.

All students entering an Associate Degree program are required to pass a basic skills examination in English composition and in mathematics (arithmetic) within the first three terms after they matriculate. Students who are deficient in one or both of the basic skills will be identified in the preregistration testing program prior to enrollment in the first term of their program. Two courses are available to assist the student in passing the basic skills tests: English 4 (3 credits) and Mathematics 198B (3 credits). The examinations will be administered on all campuses during orientation in the summer and during the final examination period at the close of fall, winter, and spring terms. Students may take the examination whether or not they are enrolled in the basic skills courses. They may take the examination without penalty until they pass it but in no case more than four times. Failure to pass it results in the student being dropped from degree status at the end of the third term.

# TWO-YEAR ASSOCIATE DEGREE MAJORS

## SECONDARY SCHOOL UNITS REQUIRED FOR ADMISSION TO ASSOCIATE DEGREE PROGRAMS

	English	Math. (A)*	Math. (B) +	Math. (C)**	Science	Other Subjects	Total
Agricultural Business	3					12	15
Air Pollution Control Engineering Technology	3	2				10	15
Architectural Engineering Technology	3	2				10	15
Biomedical Equipment Technology	3	2				10	15
Business Administration	3		2			10	15
Chemical Engineering Technology	3	2				10	15
Community Services (Administration of Justice)	3					12	15
Computer Science	3	2				10	15
Electrical Engineering Technology	3	2				10	15
Forest Technology	3		2			10	15
Highway Engineering Technology	3	2				10	15
Hotel and Food Service	3					12	15
Labor Studies	3					12	15
Letters, Arts, and Sciences	3					12	15
Mass Communications – Broadcasting	3					12	15
Mass Communications – Journalism	3					12	15
Mechanical Engineering Technology (Drafting and Design Technology)	3	2				10	15
Medical Laboratory Technology	3	2				10	15
Mining Technology	3	2				10	15
Nuclear Engineering Technology	3	2				10	15
Nursing (2-year at Behrend College)	3			2	2	8	15
Recreation and Parks	3					12	15
Retailing	3					12	15
Sociology (2-year)	3					12	15
Steel Technology	3	2				10	15
Surveying Technology	3	2				10	15
Wildlife Technology	3		2			10	15

\*Math. (A) requirements may be satisfied by either 2 units of algebra or 1 unit of algebra and 1 of plane geometry.

Math. (B) requirements may be satisfied by any 2 units of mathematics, but it is strongly recommended that the 2 units be 1 of algebra and 1 of plane geometry.

\*\*Math. (C) requirements may be satisfied by 1 unit of algebra and 1 additional unit in mathematics.

## GENERAL INFORMATION

*Admission with Advanced Standing* — A person who has acquired at least 18 semester credits at an accredited college or university may be considered for admission with advanced standing.

the requirements for admission for such a student are the same as for a beginning freshman student as far as the secondary school record is concerned. In all cases where work has been taken at other institutions, an official transcript from each place of attendance must be submitted directly to the Undergraduate Admissions Office by the institutions attended. The latter must include evidence that the student was honorably dismissed and was in good academic standing at the time of leaving.

Associate degree programs have a limit on the number of credits that may be accepted by transfer from accredited institutions. Information on credit limitations may be obtained from the academic official responsible for a particular program. Grades are not transferred with credits from other institutions and do not, therefore, enter the calculation of the term or cumulative average at this university.

*Provisional Student (Degree Seeking)* — An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admission as a degree candidate may enroll in credit courses at the University. A provisional student must apply to enroll in courses every term. (After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a provisional student can be used to fulfill the degree requirements.) A provisional student may enroll in credit courses if the following criteria are met:

1. The student is making satisfactory progress towards admission as a degree candidate. Progress is satisfactory if a student has earned 18 credits with a minimum grade-point average of 2.00 (on a 4.00 scale). If a student has earned less than 2.00, the student is given a warning. A student who has earned 27 credits with a grade-point average of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent term.
2. There is space available after degree candidates have been accommodated.
3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons may petition for an exception to the policy.

Note: An applicant holding a baccalaureate degree or higher is not eligible to enroll as a provisional student. The applicant is referred to the graduate nondegree program.

*Nondegree Student* — An applicant holding a high school diploma or its equivalent may be permitted to enroll in credit courses (either for credit or audit) at the University. A person dropped as a degree candidate from the University for poor scholarship may take courses as a nondegree student to improve a grade-point average in order to apply for reinstatement as a degree candidate at the University.

A nondegree student may apply to enroll in courses each term if the following criteria are met:

1. The applicant has completed the prerequisites for the courses to be taken or can present evidence of ability to follow successfully the courses to be taken.
2. The grade-point average for all courses taken as a nondegree student at this university must be above the minimum average as specified by senate policy. However, an applicant previously dropped from degree candidacy for poor scholarship from this or any other college or university must maintain at least a 2.00 grade-point average as a nondegree student.
3. There is space available after degree candidates and provisional students have been accommodated.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. However, a person who has been dismissed or suspended from another college or university for disciplinary reasons may petition for an exception to the policy.



## TWO-YEAR ASSOCIATE DEGREE MAJORS

**Note:** Provisional students (degree seeking) and nondegree students are subject to the same tuition charges as regular students. The Academic Policies and Procedures approved by the University Faculty Senate apply to provisional and nondegree students as stated.

An individual desiring to take associate degree courses as a provisional student (degree seeking) or nondegree student should submit the appropriate application for admission. An application form may be obtained from the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802, or from the office of the director of any Commonwealth Campus of The Pennsylvania State University.

**DIVISION OF UNDERGRADUATE STUDIES**—This division is an academic unit which offers the following programs and services:

*Freshman Testing, Counseling, and Advising* for all new freshmen. Results of comprehensive testing are used in individual academic counseling to help evaluate each student's educational objectives and to plan course schedules for the first term.

*Enrollment and Registration.* Students whose interests or career objectives change can request that they be enrolled in 2-DUS (Division of Undergraduate Studies). Specialized academic advising in DUS accompanies students' attendance in regular courses until students choose a new program and meet its academic standards for transfer.

*Academic Advising and Counseling* are available to all students, including provisional students who will eventually seek admission to a degree-granting program.

*Undergraduate Academic Information* is coordinated and disseminated through DUS to assist with and promote understanding of students' academic advising needs.

**GRADING SYSTEM**—Grades shall be reported by the following symbols: A, B, C, D, and F.

<i>Grade</i>	<i>Quality of Performance</i>	<i>Grade-Point Equivalent</i>
A	Excellent	4
B	Good	3
C	Satisfactory	2
D	Poor	1
F	Failure	0

**GRADUATION REQUIREMENTS**—In order to be graduated, a student must complete the course requirements of his major and earn at least a C average (a grade-point average of 2.00) for all courses.

**DEGREES**—The associate degree majors outlined in this catalog lead to the following degrees: Associate in Agricultural Business, Associate in Business Administration, Associate in Community Services, Associate in Computer Science, Associate in Engineering, Associate in Forest Technology, Associate in Hotel and Food Service, Associate in Labor Studies, Associate in Letters, Arts, and Sciences, Associate in Mass Communications—Broadcasting, Associate in Mass Communications—Journalism, Associate in Medical Laboratory Technology, Associate in Mining Technology, Associate in Nursing, Associate in Recreation and Parks, Associate in Retailing, Associate in Sociology, Associate in Steel Technology, and Associate in Wildlife Technology.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE CAPITOL CAMPUS**—In addition to receiving an education preparing him for employment, the graduate of an associate degree program may also qualify for admission to various programs leading to a baccalaureate degree from Penn State's Capitol Campus. Those anticipating admission to Capitol Campus should inquire at the Capitol



## GENERAL INFORMATION

Campus Admissions Office late in their freshman year or early in their sophomore year concerning baccalaureate program course requirements.

The following associate programs, with electives in English composition, college algebra, and statistics, are acceptable toward the baccalaureate degree in Business Administration offered at Capitol Campus: Agricultural Business, Business Administration, Computer Science, Hotel and Food Service, Manufacturing Technology, Medical Laboratory Technology, Nursing, Retailing, and Steel Technology.

Graduates of the associate programs of Air Pollution Control Engineering Technology, Architectural Engineering Technology, Biomedical Equipment Technology, Chemical Engineering Technology, Electrical Engineering Technology, Highway Engineering Technology, Mechanical Engineering Technology, and Surveying Technology may wish to consider continuing at the Capitol Campus in a program of study in engineering technology leading to a Bachelor of Technology degree.

The following associate degrees are also acceptable toward admission to programs leading to a baccalaureate degree at Capitol Campus: Letters, Arts, and Sciences; Mass Communications–Broadcasting; Mass Communications Journalism; and Sociology.

## STUDENT WELFARE

**ORIENTATION PROGRAM**—At the opening of the fall term all new students participate in an orientation program. In addition to becoming acquainted with the new environment in which they will live and study, students receive instruction and counseling concerning their courses of study, participation in extracurricular activities, and the cultural opportunities open to them. Registration is also held during this period.

**STUDENT GOVERNMENT**—Representative student leadership is provided on each campus of the University by a student government association, which functions through officers and representatives elected from and by the student body. In addition to their involvement in student programs at their local campuses, student officers and delegates from University campuses convene several times annually. These meetings provide for an exchange of information among the various student government associations and for system-wide coordination in student government and student activities.

**STUDENT CONDUCT**—The University regards as serious offenses all acts of unethical, immoral, dishonest, or destructive behavior, as well as violations of University regulations as set forth in each campus's student handbook and in the *Policies and Rules for Students*, a copy of which is available to each student upon registration.

**INSURANCE PROTECTION WHILE ATTENDING THE UNIVERSITY**—The Pennsylvania State University is an instrumentality of the Commonwealth performing its function of education. It is not liable for the negligence of its officers, servants, and employees when in the exercise of public or governmental powers or in the performance of public or governmental duties incident to the general educational work of the University.

Therefore any student who desires insurance protection while in attendance at the University (1) against personal injury and/or (2) against loss of property by fire or theft should arrange personally for whatever insurance seems advisable.

**STUDENT ACCIDENT / TRIP INSURANCE**—Short term group trip accident insurance is available to students who are not otherwise covered. Students taking course-connected class trips, or taking group trips with a student organization registered with the Office of Student Activities, may obtain around-the-clock coverage for accidental death and dismemberment, as well as blanket accidental medical expenses. This insurance is available for the duration of

the trip. Information about obtaining coverage and paying premiums is available from your instructor, campus business office or the University risk manager.

**HEALTH SERVICES**—The University Health Service assists in promoting and maintaining the health of students.

Every new full-time student must successfully complete a physical examination before being permitted to register for classes at the University.

The health services of the University are made available to students in accordance with a statement provided by each campus, pertinent to that campus, and published in its student handbook.

the University does not obligate itself for payment of medical services other than those provided by personnel employed or retained by the University and in facilities owned or contracted for by the University. Treatment provided in contract facilities must be authorized by the campus director, dean of student affairs, or nurse.

Students are urged to protect themselves against medical expenses that may result from injury or illness by arranging for personal insurance coverage.

**CAREER DEVELOPMENT AND PLACEMENT**—The Career Development and Placement Center assists students in continual evaluation of their educational and career plans as they progress through college and helps them identify sources of personal or academic difficulty which may interfere with their progress. Individual as well as group educational and career counseling programs are available to students.

A Student Affairs staff member at each campus has responsibility for providing placement assistance for associate degree graduates. Services include bringing employers to the campus to interview graduates for permanent employment, providing job information, and assisting students in preparing for job interviewing. The Career Development and Placement Center at the University Park Campus supplies prospective employers (national, state, and local) with information concerning the associate degree programs and works cooperatively with the Commonwealth Campuses in assisting graduates to locate suitable employment.

## STUDENT AID

In addition to the student aid information provided below, students may wish to consult the *Student Financial Aid* brochure provided in the Application for Admission packet sent to each applicant. After reviewing the brochure, additional questions should be directed to the Office of Student Aid, 135 Boucke Building, on the University Park Campus, or to the Office of Student Affairs at a Commonwealth Campus.

### AID PROGRAMS AVAILABLE TO ASSOCIATE DEGREE CANDIDATES

#### GRANTS (aid sources not requiring repayment)

##### Basic Educational Opportunity Grant (BEOG)

BEOG is the major federal grant program available to undergraduates. This award is available to undergraduates pursuing their first baccalaureate or associate degree on at least a half-time basis (4 credits per term).

##### Pennsylvania Higher Education Assistance Agency Grant (PHEAA)

This is a grant established by the Commonwealth to assist undergraduates who have a financial need as defined by PHEAA guidelines. Applicants must be residents of Pennsylvania.

**Note:** Non-Pennsylvania students should contact their state higher education assistance agencies for information on state grants available for attending Penn State.

## GENERAL INFORMATION

### Supplemental Educational Opportunity Grant (SEOG)

This grant is available to students with high documented needs. The maximum SEOG is \$1,000 with an overall maximum of \$4,000 for undergraduate study.

## LOANS

### Guaranteed Student Loan Program (GSL)

The GSL is a federally-subsidized loan program which offers students attending on at least a half-time basis the opportunity to borrow money for their education. An undergraduate may borrow up to \$2,500 per year with a maximum of \$7,500 for undergraduate studies. The GSL is available on an interest-free basis while the student is enrolled if the family's adjusted income is less than \$25,000 per year. If the family's adjusted income is greater than \$25,000, the Financial Aid Form (FAF) must be submitted to the College Scholarship Service to determine eligibility for the federal interest subsidy. Repayment begins nine months after the termination of the student's education at an interest rate of 7 percent per year simple interest.

### National Direct Student Loan (NDSL)

This program provides loans of up to \$1,250 per year with an overall maximum of \$5,000 for undergraduates. Repayment starts nine months after termination of the student's education at an interest rate of 3 percent per year simple interest. Postponement of repayment and loan cancellation may be arranged for certain types of employment following graduation.

### University Loans

University loans are funds established by donors to help students who have a documented financial need. These loans are divided into two categories: emergency and long-term.

1. Emergency loans assist students in meeting unanticipated expenses which relate to the acquisition of a college degree. These loans are interest-free and repayable on a short-term basis — 30, 60, or 90 days.
2. Long-term loans help needy students meet the educational and living expenses required to attain a college degree. Repayment starts immediately after the student completes his or her studies at a simple interest rate of 6 percent per year.

## EMPLOYMENT

### College Work-Study Program (CWSP)

The CWSP is a form of federal aid which allows a student to earn a portion of the documented financial need through approved CWSP jobs. This is a nonrepayable source of aid since the student is paid an hourly wage for his or her employment. Earnings from this program when combined with other sources of student aid may not exceed the documented need derived from the Financial Aid Form (FAF).

### Student Employment

Students who are interested in part-time employment on campus or in the State College area should contact the Student Employment Office, 105 Boucke Building, University Park, PA 16802, or contact the dean of student affairs at Commonwealth Campuses.

## SCHOLARSHIPS

### University Scholarships

University scholarships are awarded on the basis of superior high school or college academic performance and in most cases documented financial need. They are awarded either by the scholarship committees in the various academic colleges of Penn State, by the Freshman or Faculty Senate Scholarship Committees, or the Commonwealth Campus Scholarship Committees.

### State Senatorial Scholarship Program

This aid program provides \$200 or one-half of the student's tuition per term, whichever is less, for Pennsylvania residents. Requests for these awards should be made directly to the



Office of the State Senator (Pennsylvania) representing the district in which the student resides.

## HOW TO APPLY

After completing the application for admission to the University, each student seeking aid consideration should complete the forms necessary for each aid program being sought.

### I. Aid Awarded/Coordinated by the states

PHEAA grant (Pennsylvania residents only)

Other state grant/scholarship programs

Guaranteed Student Loan

(Undergraduates)

Pennsylvania residents should complete the Application for State Higher Education Grant (PHEAA grant). Students currently receiving PHEAA grants will receive renewal applications by mail from the PHEAA agency. Regular applications are available from high school guidance counselors, the Office of Student Aid, and the dean of student affairs at Commonwealth Campuses in addition to the Pennsylvania Higher Education Assistance Agency. Non-Pennsylvania students should contact their state's Higher Education Agency for information on aid programs available to them as Penn State students.

(PA and non-PA residents)

Contact a local bank or lending institution for application forms for the Guaranteed Student Loan Program. After completing the forms, submit them to the Office of Student Aid, 135 Boucke Building, University Park, PA 16802, along with a stamped envelope addressed to the lender.

### II. Aid Awarded by the Federal Government

BEOG

(All undergraduate students)

Students who have completed the Financial Aid Form (FAF) or the PHEAA grant application are automatically considered for the BEOG program. Students who have not filed the FAF or PHEAA grant application should complete the BEOG application. After receiving the Student Eligibility Report (SER), which designates eligibility for a BEOG, follow the instructions contained on the SER to finalize the award. Applications are available from high school guidance counselors, the Office of Student Aid, or the dean of student affairs at Commonwealth Campuses.

### III. Aid Awarded by The Pennsylvania State University

Supplemental Educational Opportunity Grant (SEOG)

National Direct Student Loan (NDSL)

College Work-Study Program (CWSP)

University loans and scholarships

(All students)

Complete the Financial Aid Form (FAF).

File by Feb. 15.

Note: The FAF is the only form necessary for the entering freshman to complete to be considered for the above University aid sources. The FAF is available from high school guidance counselors, the Office of Student Aid, and the dean of student affairs at Commonwealth Campuses.

(All students except entering freshmen)

Complete the Office of Student Aid's Financial Aid Application. Students may indicate on this application the type of aid they are seeking, with the exception of University scholarships. File by April 1. The application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

(All students except entering freshmen)

Complete the University Scholarship Application. Since funds are limited, applica-



## GENERAL INFORMATION

tions are only encouraged from those students with a cumulative grade-point average of 3.0 or higher. File by Feb. 15. This application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

### IV. Private Aid Sources

All students are urged to explore local scholarship/grant opportunities as well as any private low-interest loan funds offered by local employers and civic organizations.

### HOW MUCH DOES IT COST TO ATTEND PENN STATE?

One of the major concerns of students and their parents is knowing how much it will cost to attend Penn State for an academic year. The following itemized listing of expenses, although prepared for the 1977-78 academic year, may be used as a basic guide for your planning. Students may find that some of the costs vary according to individual needs and circumstances.

#### ESTIMATED STUDENT BUDGETS — 1977-78

	<i>Residence Halls or Off-Campus Housing (All Campuses)</i>	<i>Living at Home</i>
Commonwealth Campus Tuition (including Behrend College)	\$1,134*	\$1,134*
Room & Board	1,509	888
Books & Supplies	222	222
Clothing & Laundry	186	186
Travel	111	201
Personal Maintenance, Medical, & Recreation	492	492
Total*	\$3,654	\$3,123

\* For non-Pennsylvania residents the non-resident undergraduate tuition figure of \$2,643 should be substituted. The total estimated budget for an out-of-state undergraduate student at the University Park campus is \$5,163.

The 1977-78 tuition at University Park is \$1,263.

### STUDENT RIGHTS AND RESPONSIBILITIES

The Office of Student Aid at Penn State administers and coordinates the aid programs according to applicable federal and state regulations and University policies which guarantee each student equal access to financial assistance. The Office of Student Aid employs the standard need analysis services of the College Scholarship Service to assess the aid eligibility of student applicants ensuring equity of treatment among all applicants. The University does not discriminate on the basis of race, creed, color, national origin, handicap, age, or sex in any of its policies, practices, or procedures.

Eligibility for aid is contingent upon the student's financial need for assistance to meet educational costs. Each program has specific eligibility requirements which must be met before funds are awarded. In addition to financial need as a criterion for receiving aid, a student must be enrolling as a degree or provisional student. Nondegree students are not eligible to receive aid at Penn State. The University may require an official copy of the Federal Income Tax Form 1040 to verify eligibility for aid.

Satisfactory academic progress must be maintained for continued consideration for assistance. Although satisfactory progress is generally measured by institutional standards, certain aid programs have additional expectations which must be met for continued support. The

TUITION AND OTHER CHARGES

student is encouraged to carefully read all aid application materials for further information about maintaining eligibility.

The Office of Student Aid assumes that all aid applicants will keep apprised of all application deadlines pertaining to the aid sources they are seeking. Because limited funds are available, applications filed after the applicable deadline dates are considered only as funds permit. On-time applicants receive first consideration. Some aid programs have flexible application deadlines which permit students to receive consideration at most times during the year (for example, the GSL and BEOG programs). Current and prospective aid recipients are strongly encouraged to keep well-informed of aid application procedures through aid publications, news media, and agencies providing aid information such as the Office of Student Aid at University Park and the Office of Student Affairs at Commonwealth Campuses.

Aid is never automatically awarded for subsequent years. Students must reapply each year for funds. Students who plan to attend the summer term must file separate applications to be considered for almost all aid programs. The major exceptions to this requirement are as follows:

- 1. Entering freshmen seeking aid awarded by the University (see “How to Apply” above) must file only the FAF to receive consideration for the summer term if they have been admitted to the University specifically to begin during the summer term; and
- 2. The BEOG program has no separate summer application and is generally awarded to students during the fall-winter-spring academic year. (BEOG recipients not attending the entire fall-winter-spring year should contact the Office of Student Aid to determine if a summer payment is possible.)

One of the goals of the Office of Student Aid is to help financial aid recipients receive a financial aid package which will meet the students’ documented financial need. The financial aid package can be composed of federal aid, state grant monies, private award sources, or any other source of funds available to the student, including earnings from University employment.

It is the responsibility of the Office of Student Aid, however, to assure the Federal Government that federal aid recipients will not be permitted to retain financial aid *exceeding* the students’ need. Although repayment was necessary for fewer than one percent of Penn State students in the previous year, students should be aware that if the aid received is in excess of need, they will be notified of their responsibility to return the excess amount to the University.

TUITION AND OTHER CHARGES

*NOTE: The University reserves the right to revise tuition and charges without further notice. Tuition and charges for baccalaureate and graduate programs are listed separately in the Baccalaureate Degree Programs, Graduate Degree Programs, and Capitol Campus catalogs. Penn State has four ten-week terms each year. Students normally attend three terms per year.*

TUITION—Tuition per term for associate degree students:

	<i>Pennsylvanians</i>	<i>Non-Pennsylvanians</i>
8 or more credits:		
University Park Campus	\$421	\$881
Other Commonwealth Campuses	378	881
7 or fewer credits:		
University Park Campus—rate per credit	53	110
Other Commonwealth Campuses—rate per credit	41	110

## GENERAL INFORMATION

*Enrollment Charge*—All entering students who plan to enroll for 8 or more credits are required to pay a nonrefundable enrollment charge of \$52 upon acceptance of an offer of admission.

*General Deposit*—All full-time undergraduate students are required to make a general deposit of \$50 at the time of admission. This deposit will serve to safeguard the property and equipment used by students in their course of study. It will be retained until a student withdraws or is graduated.

The deposit, less any charges for equipment damages, losses, and forfeitures, will be refunded early in the subsequent term to the student who has withdrawn or been graduated. The refund will be made by check and mailed to the student's home address. If at any time the balance of the deposit falls below the minimum amount of \$15, the deposit must be replenished.

*Credit by Examination*—A charge of \$15 per credit is made for credit by examination. For evaluation of credits completed elsewhere a charge of \$10 is made for those applying for admission and a charge of \$1 for those who are already matriculated.

*Student Activities*—Student activities charges are determined by elected representatives of the student body, together with a faculty representative.

*Change of Schedule Charge*—Unless a change is necessitated by the University, a charge of \$2 is made for each change of schedule.

*Late Registration Charge*—Unless the delay is unavoidable, \$10 is charged a student who fails to register on the appointed day.

*Other Expenses*—Books and supplies must be secured by the student. These vary from approximately \$60 per term, depending upon the program.

**TERMS OF PAYMENT**—Tuition and charges, including room and board, are due and payable in advance of each term at the Office of the Bursar, 103 Shields Building, University Park, PA 16802. Registration for courses may not be completed until tuition and charges are paid.

Approximately six weeks in advance of each term, the University will mail to each continuing and newly admitted student of record an estimated bill for tuition and, where applicable, residence hall charges. Payment by mail is encouraged before the established deadline. The receipt is returned to the student by mail and will permit registration for the designated number of credits. This receipt is likewise authorization to obtain, where applicable, the residence hall key and meal ticket. If checks tendered for payment of tuition and charges are not paid upon presentation to the maker's bank, the student will automatically incur the late payment fee of \$25, and the receipt previously mailed will be considered null and void.

Any student who does not fulfill payment of obligations by the deadline established may be charged the late payment fee of \$25. This charge for late payment also applies to unpaid student supplemental charges. Students whose accounts are delinquent for more than ten days are subject to suspension from the University.

**WITHDRAWALS AND REFUNDS**—In the event of withdrawal, charges for tuition will be refunded under the following policy:

Refund of 80 percent upon withdrawal before the end of the first week of the term (seventh consecutive calendar day from the first day of classes) and a decrease of 20 percent for each week thereafter up to and including the fourth consecutive calendar week. No amount will be refunded for withdrawal after the fourth consecutive calendar week of the term.

Under this policy if a student is enrolled for 8 or fewer credits and drops 1 or more credits, refunds will be determined in accordance with the above policy.

Any refund policy related to adjustments in room and board will be a part of the housing contract.

# MAJORS

## GENERAL DEGREE REQUIREMENTS

There are a number of areas in which a certain level of competence is expected of all recipients of associate degrees. Therefore, all associate degree programs of the University demand the satisfactory completion of the following requirements:

- 3 credits in the social sciences
- 3 credits in the arts and humanities
- 3 credits in English
- 3 credits in speech communication
- 6 credits in the physical sciences, biological science, or mathematics
- 3 credits in general education electives\*

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\*If the student has not had courses in all three areas of physical science, biological science, and mathematics either in high school or in his or her associate degree program, these three "general education" credits must be used to remedy this deficiency. Otherwise, they may be in any of the areas listed above.

**RESERVATIONS**—The University reserves the right to make such program or class changes as may become necessary because of insufficient enrollment or other contingencies. The University also reserves the right to make any necessary changes in tuition and charges without prior notice. Courses and programs described and listed in this catalog are also subject to change without notice.



## ASSOCIATE DEGREE MAJORS

### AEROSPACE ENGINEERING TECHNOLOGY

This major prepares students for careers as supportive personnel in the aerospace field. Graduates will work as designers and laboratory technicians in the areas of aircraft and missile structures, aerodynamics, and propulsion.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 1, Engineering Drawing	2	Cmp. Sc. 1, Basic Computer Programming	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 12, Spatial Analysis	2
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	—		—
	12		12
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Aersp. 800, Applied Aerodynamics	3	Aersp. 803, Technical Aerodynamics	3
Aersp. 806, Computer Applications to Aerospace Engineering	3	Aersp. 809, Aerospace Laboratory	2
E.Mch. 811, Elementary Mechanics	3	E.E. 800, Applied Electricity	2
Math. 803, Technical Calculus	3	E.Mch. 813, Strength and Properties of Materials	3
	—	I.E. 811, Manufacturing Materials and Processes	3
	12		—
			13
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Aersp. 802, Aircraft Structural Analysis	3	Aersp. 807, Aircraft Structural Design	3
Aersp. 804, Aircraft Propulsion	3	Sp.Com. 200, Effective Speech	3
Aersp. 808, Electronic Instrumentation	3	Humanities selection	3
Social science selection	3	Technical selection	3
	—		—
	12		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## AGRICULTURAL BUSINESS

This major prepares students for service in commercial farming and businesses which serve agriculture. The latter includes businesses which process and market farm products, as well as those which provide farmers with all kinds of production supplies, such as feeds, fertilizers, chemicals, biological products, and machinery. Training is also provided in agricultural business organization, management, and sales. This basic program is supported with courses in crop and livestock production and in agricultural engineering.

To be eligible to receive the associate degree, a student must have completed the prescribed major of 62 credits. The first three terms are offered at selected Commonwealth Campuses. The last three terms are offered at the University Park Campus.

FIRST TERM		SECOND TERM	
Acctg. 801, Introductory Accounting	Credits 3	Biological science selection	Credits 3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	B.Law 843, Introduction to Business Law	3
Social science selection	3	Engl. 10, Composition and Rhetoric II; or selection	3
	—	Sp.Com. 200, Effective Speech	3
	9		12
THIRD TERM		FOURTH TERM	
Chem. 11, Introductory Chemistry	Credits 3	Ag.E. 800, Farm Power	Credits 2
Humanities selection	3	Ag.E. 801, Farm Structures and Utilities	3
Elective	3	Ag.Ec. 801, Management of Commercial Farms	3
	—	Ag.Ec. 803, Introduction to Agricultural Business	3
	+9		11
FIFTH TERM		SIXTH TERM	
Ag.Ec. 802, Agricultural Marketing and Sales	Credits 3	Ag.Ec. 800, The Agricultural Economy	Credits 3
An.Sc. 800, Livestock Production	2	Plt.Sc. 800, Field and Forage Crop Production	3
An.Sc. 801, Poultry Production	2	Plt.Sc. 801, Production of Horticultural Crops	3
An.Sc. 802, Dairy Production	2	Plt.Sc. 802, Use of Agricultural Chemicals	3
	—		12
	+9		

\*Students will be placed in Engl. 4 or Engl. 10 on the basis of English Placement Test scores.

+A student may schedule up to 12 credits in these terms. If additional credits are scheduled, suggested courses are mathematics, economics, business management, or biological science.

## ASSOCIATE DEGREE MAJORS

### AIR POLLUTION CONTROL ENGINEERING TECHNOLOGY

This major prepares students for positions as air pollution control technicians, working for a local, state, or federal agency. Technicians may be responsible for the calibration, installation, and operation of air sampling and monitoring equipment, investigation of complaints, plant inspections, and source evaluation. As an industrial air pollution control technician, these same responsibilities may be required with the addition of evaluation and monitoring of gas cleaning equipment performance.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Cmp.Sc. 1, Basic Computer Programming	1
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	—		—
	12		11
			—
			11
THIRD TERM	<i>Credits</i>	+ FOURTH TERM	<i>Credits</i>
Chem. 13, Chemical Principles	3	Chem. 23, Introduction to Modern Analytical Chemistry	4
Chem. 15, Experimental Chemistry	1	E.E. 801, Fundamentals of D.C. Circuits	3
Math. 803, Technical Calculus	3	E.Mch. 810, Basic Mechanics, or E.Mch. 811, Elementary Mechanics	2-3
Sp.Com. 200, Effective Speech	3	Phys. 150, Technical Physics	3
Social science selection	—		—
	13		12-13
			—
			12-13
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Ch.E. 802, Chemical Technology	3	E.E. 814, Electrical Circuits	4
Ch.E. 830, Industrial Chemistry	3	E.E. 818, Electrical Circuits Laboratory	1
E.E. 809, D.C. Circuits Laboratory	2	M.E. 882, Air Resource Management	2
Humanities selection	3	M.E. 884, Sampling and Monitoring Program	2
	—	Meteo. 303, Introductory Meteorology	3
	11		—
			12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

+Second year to be taken at Berks Campus.

# ARCHITECTURAL ENGINEERING TECHNOLOGY

The graduates of this major are prepared for employment in architectural, building engineering, or industrialized housing firms.

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

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## ASSOCIATE DEGREE MAJORS

### BIOMEDICAL EQUIPMENT TECHNOLOGY

This major prepares students for careers as biomedical equipment technicians, men and women responsible for specifying, calibrating, maintaining, and replacing clinical electronic equipment used in patient care. Modern health care facilities now have complex electronic instrumentation and apparatus located in virtually every diagnostic and patient treatment area. While these innovations result in improved patient care, they also require extensive maintenance procedures, new equipment calibration, complex servicing and repair, as well as attention to patient and operator safety. A total of 74-75 credits are required for graduation.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or		E.E. 809, D.C. Circuits Laboratory	2
Engl. 10, Composition and Rhetoric I	3	Math. 802, Technical Mathematics	3
Engr. 5, Experimental Methods for Engineers; or if not available,		Phys. 151, Technical Physics	3
Engr. 2, Engineering Orientation	1		—
Math. 801, Technical Mathematics	3		11
Phys. 150, Technical Physics	3		
	—		
	12		
THIRD TERM	Credits	FOURTH TERM	Credits
Cmp.Sc. 1, Basic Computer Programming	1	Biol. 41, Physiology	3
E.E. 814, Electrical Circuits	4	Chem. 11, Introductory Chemistry	3
E.E. 818, Electrical Circuits Laboratory	1	E.E. 807, A.C. and Electronics Laboratory	2
*Engl. 10, Composition and Rhetoric I; or		E.E. 810, Fundamentals of Semiconductors	3
Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3		—
Math. 803, Technical Calculus	3		11
	—		
	12		
FIFTH TERM	Credits	SIXTH TERM	Credits
B.E.T. 801, Physiological Transducers	3	B.E.T. 802, Biomedical Instrumentation and Systems	3
Chem. 12, Chemical Principles	3-4	M.E. 881, Elementary Thermo and Fluid Dynamics	2
E.E. 816, Linear Electronic Circuits	3	Sp.Com. 200, Effective Speech	3
E.E. 821, Linear Electronics Laboratory	1	Humanities selection	3
Social science selection	3		—
	—		11
	13-14		
SEVENTH TERM (SUMMER)	Credits		
B.E.T. 803, Biomedical Equipment Laboratory (Internship)	4		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## BUSINESS ADMINISTRATION

This two-year, college-level academic program is designed to provide instruction in business administration that fulfills the requirements of various levels of responsibility higher than that held by high school graduates.

The primary objective of this major is to provide a managerially oriented program with sufficient communicative and mathematical skills, socially relevant course work, and advanced courses in specific business specialties to develop a well-rounded graduate.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	12
*Engl. 4, 10, 826; Sp.Com. 200	
B. Social sciences, humanities	9
History, humanities, political science, psychology, sociology selection	
C. Physical education	2
II. Requirements for the Major (45 credits)	
A. General	30
Econ. 2 or 4; Computer Science; Math. 800 or 17; Acctg. 801, 802; B.Law 843; Fin. 807; Mgmt. 800; Mktg. 800; Q.B.A. 101	
B. Specialization	15
Students will select five courses from the following list according to their area of specialization: Acctg. 803, 806, 807; B.A. 803; B.Law 850; B.Log. 102, 104, 206; Fin. 108, 210; Ins. 800, 810, 820, 830; I.B. 862; Mktg. 801, 802, 804, 805, 806; Mgmt. 801, 802; R.Est. 800, 810, 830; Q.B.A. 102	

\*Students will be placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students not required to take Engl. 4 will take Engl. 20.

## ASSOCIATE DEGREE MAJORS

### CHEMICAL ENGINEERING TECHNOLOGY

This major prepares graduates for positions as assistants to chemists and chemical engineers, assistants in research and control laboratories, and trainees for future supervisory positions in manufacturing and production.

It provides the training necessary for such positions, including a reasonable proficiency in basic sciences, mathematics, communication skills, and the basic principles of chemical engineering technology.

FIRST TERM		SECOND TERM	
Chem. 11, Introductory Chemistry	Credits 3	Chem. 12, Chemical Principles	Credits 3-4
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Cmp.Sc. 1, Basic Computer Programming	1
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II;	
Math. 801, Technical Mathematics	3	or Engl. 826, Report Writing	3
	—	Math. 802, Technical Mathematics	3
	12		—
			11-12
THIRD TERM		FOURTH TERM	
Ch.E. 830, Industrial Chemistry	Credits 3	Ch.E. 800, Technical Calculations	Credits 3
Chem. 13, Chemical Principles	3	Chem. 23, Introduction to Modern Analytical Chemistry	4
Chem. 15, Experimental Chemistry	1	Phys. 150, Technical Physics	3
Math. 803, Technical Calculus	3	Humanities selection	3
Sp.Com. 200, Effective Speech	3		—
	—		13
	13		
FIFTH TERM		SIXTH TERM	
Ch.E. 802, Chemical Technology	Credits 3	Ch.E. 803, Chemical Technology	Credits 3
Chem. 34, Organic Chemistry	3	Ch.E. 820, Chemical Technology Laboratory	4
Phys. 151, Technical Physics	3	Technical selection	3
Social science selection	3		—
	—		10
	12		

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\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## COMMUNITY SERVICES

The Community Services major is designed to provide entry-level professional competency in one of several human service fields. The objective of the Administration of Justice emphasis is to provide a general education background, a knowledge base in human development, and a core of professional skills.

The Administration of Justice emphasis educates and upgrades career personnel in police departments, probation and parole agencies, and correctional institutions. Challenges and problems in law enforcement, current approaches and alternatives for crime control, prevention, and rehabilitation are studied. The program includes one term of field experience in a local community agency.

### *The Administration of Justice Emphasis*

	<i>Credits</i>
I. General Education Requirements (21 credits)	
A. Communication skills	
Engl. 10, 20; Sp.Com. 200	9
B. Biological and physical sciences	
A minimum of 3 credits in each area	6
C. Arts and humanities	3
D. Social and behavioral sciences	3
II. Requirements for the Major (41 credits)	
A. General requirements	
Com.D. 7, H.Dev. 100, I.F.S. 129	7
B. Requirements for Administration of Justice emphasis	34
H.Dev. 321 (12)*, or L.E.C. 321 (8) plus 4 additional credits of approved professional electives; L.E.C. 111 and 221, plus 16 credits of professional electives with consent of adviser.	

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\*Guidelines for Field Placement include:

1. Agencies utilized are local agencies.
2. Priority for placement is made for students with higher term standings.
3. Prerequisites for placement include Com.D. 7 and L.E.C. 111.



ASSOCIATE DEGREE MAJORS

COMPUTER SCIENCE

The primary objective of this program is to prepare graduates for immediate and continuing employability as application programmers, associate systems designers, or associate systems programmers.

To meet this objective the program is designed to ensure a thorough knowledge of the techniques of programming general-purpose digital computers, and includes extensive practice — using contemporary programming technologies — in the analysis, organization, validation, and documentation of effective computer code. The program also includes practical knowledge of the logical organization of modern digital computers and related peripheral equipment, the structure of operating systems and compilers, and considerations in the design of information systems.

The General Education Requirements provide the student with an extension to his basic educational foundation. The Requirements for the Major give the graduate technical competence in the computing and data processing field. The Application Specialization provides a practical knowledge of a minor or an application field within which the graduate may profitably utilize the acquired computing talent.

		<i>Scheduling Recommendation by Term Standing</i>	
		1-3	4-6
I. General Education Requirements (29 credits)			
A. Communication skills (9 credits)			
English selection (6)		x	—
Sp.Com. 200 (3)		—	x
B. Mathematics and statistics (12 credits)			
Math. 17 (3), 18 (3)		x	—
Mathematics selection (3)		x	—
Quantitative business analysis or statistics selection (3)		—	x
C. Social science, arts, humanities (6 credits)			
Social science selection (3)		x	x
Arts and humanities selection (3)		x	x
D. Physical sciences (2 credits)			
Physical education selection		x	—
II. Requirements for the Major (22 credits)			
A. General			
Cmp.Sc. 101, 102, 140 (9)		x	—
Cmp.Sc. 804 (1)		x	—
Cmp.Sc. 44, 54, 64 (9)		—	x
Cmp.Sc. 805 (3)		—	x
B. Application Specialization (12 credits)			
Related course work in an area of computer application — to be approved by the student's adviser. These courses may be chosen from areas such as accounting, retail operations, general business, mathematics, general science, environmental resources, etc., and are selected from the courses offered at the student's campus.		x	x

# ELECTRICAL ENGINEERING TECHNOLOGY

## ELECTRICAL ENGINEERING TECHNOLOGY

This major is designed to prepare graduates for technological service with electrical utilities, manufacturers of electrical and electronic equipment, and electrical maintenance and instrument departments of various industrial concerns. The principal objective is to provide a practical knowledge of electrical machinery and its control, as well as of electronic theory and its application in communication and control systems.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		<hr/>
	12		11
THIRD TERM	<i>Credits</i>		
Cmp.Sc. 1, Basic Computer Programming	1		
E.E. 814, Electrical Circuits	4		
E.E. 818, Electrical Circuits Laboratory	1		
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3		
Math. 803, Technical Calculus	3		
	<hr/>		
	12		
SUMMER TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
E.E. 813, Fundamentals of Electrical Machines	3	E.E. 804, A.C. Circuits	2
		E.E. 807, A.C. and Electronics Laboratory	2
		E.E. 810, Fundamentals of Semiconductors	3
		E.Mch. 810, Basic Mechanics	2
		Social science selection	3
			<hr/>
			12
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
E.E. 815, A.C. Machinery and Control	4	E.E. 817, Advanced Electronics	4
E.E. 816, Linear Electronic Circuits	3	E.E. 820, Advanced Electronics Laboratory	2
E.E. 819, A.C. Machinery Laboratory	1	Humanities selection	3
E.E. 821, Linear Electronics Laboratory	1	Technical selection	2-3
Sp.Com. 200, Effective Speech	3		<hr/>
	12		11-12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## ASSOCIATE DEGREE MAJORS

### FOREST TECHNOLOGY

The objectives of this major are to train students in the techniques that are basic to planning, organizing, directing, and managing forestry enterprises and to provide a program of general studies which will serve as a foundation for future intellectual growth. It is intended that graduates will act in a supporting capacity to professional foresters.

To be eligible to receive the degree of Associate in Forest Technology, a student must have completed the prescribed major of 69 credits.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
*Engl. 10 Composition and Rhetoric I; or		For. 800, Introduction to Forestry	1
Engl. 4, Basic Writing Skills	3	For. 806, Forest Inventories	3
For. 800, Introduction to Forestry	1	For. 815, Forest Surveying I	3
For. 802, Dendrology	3	Math. 802, Technical Mathematics	3
For. 804, Forest Mensuration	3		—
Math. 801, Technical Mathematics	3		10
	—		
	13		

THIRD TERM	<i>Credits</i>
For. 800, Introduction to Forestry	1
For. 808, Forest Protection	3
Humanities selection	3
Acctg. 16, Introductory Accounting Survey	3
For. 816, Forest Surveying II	3
	—
	13

SUMMER TERM	<i>Credits</i>
For. 813, Summer Field Practice	4

FOURTH TERM	<i>Credits</i>
Engl. 826, Report Writing	3
For. 807, Forest Recreation	3
For. 812, Elements of Project	
Supervision in Forestry	3
For. 814, Forestry Leadership Practicum	1
	—
	10

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
For. 811, Forest Photo Interpretation	4	For. 809, Forest Valuation	3
Sp.Com. 200, Effective Speech	3	For. 810, Forest Improvements	3
Social science selection	3	For. 817, Urban Forestry	3
	—		—
	10		9

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10.

## HIGHWAY ENGINEERING TECHNOLOGY

This major prepares highway construction technicians to perform many of the planning and design tasks necessary in the construction of highways, railroads, bridges, viaducts, and airfields. In the planning stages of construction a highway construction technician may be engaged in estimating costs, purchasing materials, preparing specifications, computing fills, cuts, drainage requirements, drafting, designing, or surveying. During actual construction, such technicians may perform supervisory functions and inspection.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	E.Mch. 810, Basic Mechanics	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 150, Technical Physics	3
	<hr/> 12		<hr/> 13
THIRD TERM		FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
C.E. 812, Curves and Earthwork	3	C.E. 814, Photogrammetry	3
Cmp.Sc. 1, Basic Computer Programming	1	C.E. 818, Route Surveying	2
E.Mch. 813, Strength and Properties of Materials	3	*Engl. 826, Report Writing	3
Math. 803, Technical Calculus	3	G.Sc. 1, Physical Geology	3
Phys. 151, Technical Physics	3		<hr/> 11
	<hr/> 13		
FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
C.E. 821, Concrete Technology	3	C.E. 824, Asphalt Technology	3
C.E. 822, Soil Mechanics	3	C.E. 825, Construction Estimating	3
C.E. 823, Highway Organization and Operations	3	Econ. 14, Principles of Economics	3
Human. 1, Values of the Western Cultural Heritage	3	Sp.Com. 200, Effective Speech	3
	<hr/> 12		<hr/> 12

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\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.



## ASSOCIATE DEGREE MAJORS

### HOTEL AND FOOD SERVICE

This is an intensive six-term major designed to prepare students for responsible executive positions in the hospitality industry and in health facilities food service administration. The course of study places heavy reliance on experience acquired in an on-the-job setting. Students who achieve outstanding records may, upon completing this program, apply for admission to the baccalaureate degree program in Food Service and Housing Administration in the College of Human Development. Nine additional terms of satisfactory work are required to earn the baccalaureate degree.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	
6 credits in English, Sp.Com. 200	9
B. Arts, humanities, social and behavioral sciences	12
At least 3 credits in economics	
C. Physical education	2
II. Requirements for the Major	
A. General	15
F.S.H.A. 50, 225; H.F.S. 850, 860; 3 credits in accounting	
B. Specialization	30
Students may select an emphasis in Hospitality Administration or Health Facilities Food Service Administration.	
Students emphasizing Hospitality Administration will be required to take F.S.H.A. 102, H.F.S. 804 and 870, plus 20 additional credits with the approval of their adviser. Students emphasizing Health Facilities Food Service Administration will be required to take F.S.H.A. 103, H.F.S. 875, Nutr. 351 and 800, plus 16 additional credits with the approval of their adviser.	

### LABOR STUDIES

The purpose of this program is to help employees improve their understanding and competence in coping with personal, group, and organizational problems at their worksites, in relationships with employers, and in transactions with the community, the economy, and the polity. The program consists of a core of labor courses supplemented by introductory liberal arts studies which provide (1) basic communication skills, (2) conceptual tools of analysis, and (3) a more general cultural context for the examination of labor problems.

This major leads to the degree of Associate in Labor Studies.

I. General Education Requirements (21 credits)	<i>Credits</i>
A. Communication skills	
English selection, speech communication selection	6
B. Humanities, natural, and social sciences	15
Biological science, humanities, mathematics, physical science, and social science selections	
II. Requirements for the Major	
A. General	
Econ. 14, Hist. 21, Pl.Sc. 1, Psy. 2, Soc.1	15
Management selection, speech selection	6
B. Labor Studies	18
L.S. 100*, 102, 103, 104, 156, 189	
	<hr/>
	60

\*Will be accepted toward the baccalaureate major in Labor Studies.

**LETTERS, ARTS, AND SCIENCES\***

The objectives of this program are to broaden the student's understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student's interests or career plans. This program is a complete two-year degree program. However, graduates who later seek admission to baccalaureate programs may apply baccalaureate credits toward the new degree. Any 800-level credits taken in the Letters, Arts, and Sciences program are not applicable toward a baccalaureate degree.

This major leads to the degree of Associate in Letters, Arts, and Sciences.

	<i>Scheduling Recommendation by Term Standing</i>	
	1-3	4-6
I. Required Courses (36 credits)		
Communication skills (9 credits)		
+ Engl. 10 (3), Engl. 20 (3)	x	—
Sp.Com. 200 (3)	x	—
Arts (6 credits)		
**Select 6 credits in any courses designated as arts	x	x
Humanities (6 credits)		
**Select 6 credits in any courses designated as humanities	x	x
Social and behavioral sciences (6 credits)		
**Select 6 credits in any courses designated as social and behavioral sciences	x	x
Science (6 credits)		
**Select 6 credits in any courses designated physical, biological, or earth and space sciences	x	x
Mathematics (3 credits)		
**Select 3 credits in mathematics (Math. 4, 6, 10 <i>not</i> acceptable), statistics, computer science, or philosophy (Phil. 12, 212 <i>only</i> )	x	x
II. Related Courses (9 credits)		
**Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, science and mathematics	x	x
III. Electives (15 credits)	x	x

\*The 45 required and related credits must be baccalaureate-level courses. For those intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a Bachelor of Arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken.

+Students will be placed in Engl. 4, Engl. 10, or Engl. 30 on the basis of English Placement Test scores. If a student is placed in Engl. 30, successful completion of that course will satisfy the English requirement; in addition, 3 credits will be given for Engl. 10.

\*\*Courses which will satisfy the arts, humanities, social and behavioral sciences, and science and mathematics requirements are defined in the University-wide requirements for a Bachelor of Arts degree described in the *Baccalaureate Degree Programs* catalog. Please note that subject areas which are listed as acceptable under more than one category may be applied to *only one* category.

ASSOCIATE DEGREE MAJORS

MANUFACTURING ENGINEERING TECHNOLOGY

This major prepares graduates for employment by manufacturing enterprises in those activities which are associated with production management. The objective is to qualify students in basic engineering science, principles of methods analysis, motion study, time study, wage payment, production planning and control, and quality control.

The work of the first three terms will provide a basic knowledge of industrial processes and will enable the student to do simple drafting and perform routine clerical and production functions. Students completing the major will have a clear understanding of the management controls required to operate manufacturing businesses. This should lead to confidence in doing satisfactory work in computing standards, laying out stations, improving methods, writing job descriptions, estimating costs, and making routine calculations. At the present time this major is not being offered.

<b>FIRST TERM</b>	<i>Credits</i>	<b>SECOND TERM</b>	<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.G. 12, Spatial Analysis	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 150, Technical Physics	3
	—		—
	9		11
<b>THIRD TERM</b>	<i>Credits</i>	<b>+ FOURTH TERM</b>	<i>Credits</i>
I.E. 811, Manufacturing Materials and Processes	3	Cmp.Sc. 1, Basic Computer Programming	1
Math. 803, Technical Calculus	3	E.Mch. 811, Elementary Mechanics	3
Phys. 151, Technical Physics	3	I.E. 809, Inspection and Quality Control	3
Social science selection	3	I.E. 812, Manufacturing Processes	3
	—		—
	12		10
<b>FIFTH TERM</b>	<i>Credits</i>	<b>SIXTH TERM</b>	<i>Credits</i>
Cmp.Sc. 101, Introduction to Algorithmic Processes	3	I.E. 816, Methods Analysis and Motion Study	3
E.Mch. 813, Strength and Properties of Materials	3	I.E. 819, Numerical Control	3
I.E. 315, Industrial Organization and Administration	3	Sp.Com. 200, Effective Speech	3
	—		—
	9		9
<b>SEVENTH TERM</b>	<i>Credits</i>		
I.E. 810, Production Layout and Control	3		
I.E. 817, Time Study and Wage Payment	3		
Humanities selection	3		
Technical selection	2-3		
	—		
	11-12		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

+Summer term: I.E. 802 for three weeks at University Park only; balance of term at Commonwealth Campus.

**MASS COMMUNICATIONS—ADVERTISING**

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to advertising. At the present time this major is not being offered.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Engl. 4, Basic Writing Skills	3	Engl. 10, Composition and Rhetoric I	3
Journ. 800, History and Survey of Mass Communications	3	Journ. 811, Advertising Copywriting	3
So.St. 800, Human Cultures and the Individual	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	<hr/>		<hr/>
	10		12
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Human. 800, Sources of Morality	3	Arts 1, The Arts	3
Journ. 812, Advertising Layout	3	Journ. 813, Advertising Media and Campaigns	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	<hr/>		<hr/>
	10		10
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Human. 1, Values of the Western Cultural Heritage	3	Music 5, The Fundamentals of Music Appreciation	3
Journ. 814, Newspaper Advertising	3	Journ. 820, Newspaper Management	3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	<hr/>		<hr/>
	10		12

**MASS COMMUNICATIONS—BROADCASTING**

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to broadcasting. A total of 61-63 credits are required for graduation.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Journ. 200, Mass Media and Society	3	Math. 800, Business Mathematics	3
Sp.Com. 801, Survey of Broadcasting	3	Sp.Com. 802, Radio and Television Announcing	3
	<hr/>		<hr/>
	9		9



ASSOCIATE DEGREE MAJORS

THIRD TERM	Credits	FOURTH TERM	Credits
Sp.Com. 803, Basic Writing for Radio and Television	3	Human. 101, Modern Science and Human Values	3
*Humanities selection	3	Sp.Com. 804, Radio Programming, Production, and Performance	3
*Physical or biological science selection	3	Sp.Com. 200, Effective Speech	3
	—	*Arts selection	3
	9		—
			12
FIFTH TERM	Credits	SIXTH TERM	Credits
Sp.Com. 280, Oral Interpretation	3	Music 5, Fundamentals of Music Appreciation	3
Sp.Com. 805, Television Programming, Production, and Performance	3	Sp.Com. 830, Directed Studies	1-3
*Social science selection	3	Thea. 109, The Dramatic Arts in the Mass Media	3
Elective	3	Elective	3
	—		—
	12		10-12

\*To be selected with the approval of the program coordinator or adviser.

MASS COMMUNICATIONS—JOURNALISM

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to journalism.

FIRST TERM	Credits	SECOND TERM	Credits
Engl. 4, Basic Writing Skills	3	Engl. 10, Composition and Rhetoric I	3
Journ. 800, History and Survey of Mass Communications	3	Journ. 801, Beginning News Writing	3
So.St. 800, Human Cultures and the Individual	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	—		—
	10		12
THIRD TERM	Credits	FOURTH TERM	Credits
Human. 800, Sources of Morality	3	Arts 1, The Arts	3
Journ. 802, Beginning Reporting	3	Journ. 803, Fundamentals of Editing	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	—		—
	10		10
FIFTH TERM	Credits	SIXTH TERM	Credits
Human. 1, Values of the Western Cultural Heritage	3	Music 5, The Fundamentals of Music Appreciation	3
Journ. 804, Reporting the Community	3	Journ. 820, Newspaper Management	3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	—		—
	10		12

# MECHANICAL ENGINEERING TECHNOLOGY (DRAFTING AND DESIGN TECHNOLOGY)

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.G. 12, Spatial Analysis	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II;	
Engr. 2, Engineering Orientation	1	or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	<hr/> 12		<hr/> 11

+SUMMER TERM	<i>Credits</i>
I.E. 812, Manufacturing Processes	3

FOURTH TERM	<i>Credits</i>
E.G. 803, Advanced Engineering Drawing	3
E.Mch. 813, Strength and Properties of Materials	3
I.E. 315, Industrial Organization and Administration	3
Sp.Com. 200, Effective Speech	3
	<hr/> 12

<b>FIFTH TERM</b>	<i>Credits</i>
I.E. 815, Production Design	3
M.E. 805, Kinematics	3
Social science selection	3
Technical selection	2-3
	<hr/>
	11-12

<b>SIXTH TERM</b>	<i>Credits</i>
A.E. 809, Structure Design	3
M.E. 810, Product Design	3
Humanities selection	3
Technical selection	3
	<hr/> 12

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## ASSOCIATE DEGREE MAJORS

### MEDICAL LABORATORY TECHNOLOGY

This two-year program (eight terms) is designed to provide the necessary general and technical training for hospital personnel between the level of the Certified Laboratory Assistant and the Medical Technologist. The program includes one full year of intensive clinical experience at an affiliated hospital and the theoretical background necessary for the clinical procedures performed by the registered Medical Laboratory Technician. The program is a two-year program starting in the summer term. A total of 60-61 credits are required for graduation.

#### I. General Education Requirements (38-39 credits)

Communications (6 credits)

Engl. 10 (3)

Sp.Com. 200 (3)

Quantification (4 credits)

Math 4, 5, or 10 (3)

Cmp.Sc. 1 (1)

Natural Science (19-20 credits)

Biol. 29 (4)

Biol. 41 (3)

Biol. 42 (1)

Chem. 12 (3-4)

Chem. 14 (1)

Chem. 34 (3)

Micrb. 1 (2)

Micrb. 2 (2)

Arts and Humanities (3 credits)

Selection (3)

Social and Behavioral Sciences (6 credits)

Selection (6)

#### II. \*Requirements for the Major (22 credits)

Bioch. 100 (6)

Micrb. 101 (5)

Micrb. 102 (5)

Micrb. 801 (6)

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\*Medical Laboratory Technician clinical experience (22 credits). Affiliation now exists with St. Joseph Hospital, Hazleton, Pennsylvania.

## MINING TECHNOLOGY

A student in mining technology receives a blend of basic sciences, mathematics, communications, humanities and social sciences, and applied courses during the period of study. These courses are sequenced so that basic principles of physical processes are used to understand the specific procedures involved in mining. The curriculum covers a complete spread of material at a level consistent with potential careers of mining technology graduates.

This major prepares students for career positions of a management-oriented or an engineering-oriented nature in the mining industry. Two options, selected at the beginning of the second year, provide a choice between production work and maintenance work. Many of the graduates of this program, after serving the necessary apprenticeship, become certified managers in their fields.

The Maintenance Option prepares a student to become a maintenance supervisor. Initially, the graduate would work as an apprentice electrician or mechanic and would gain experience in repairs and in planned maintenance. Once certification is obtained, it is expected that the graduate would become involved with maintenance planning, working as or with the chief mine mechanic or chief mine electrician.

The Production Option prepares a student to become a mine foreman or an engineering aide. Initially, some of the assigned duties are to run transit and act as survey party chief, keep mine maps up-to-date and make projections, take samples and run analyses, make time studies, and assist with materials handling layouts.

### MAINTENANCE OPTION

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Econ. 14, Principles of Economics	3	Cmp.Sc. 1, Basic Computer Programming	1
Engl. 4, Basic Writing Skills; or		E.G. 1, Engineering Drawing	2
Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I;	
Math. 801, Technical Mathematics	3	or Engl. 20, Composition and Rhetoric II	3
Mng.T. 800, Mining Technology		Math. 802, Technical Mathematics	3
Orientation	1	Phys. 150, Technical Physics	3
	—		—
	10		12
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Mng.T. 807, Electrical Mine	
E.Mch. 811, Elementary Mechanics	3	Machine Circuits	3
Mng.T. 804, Mine Plant Technology	3	Mng.T. 810, Mine Machine Dynamics	3
Sp.Com. 200, Effective Speech	3	Humanities selection	3
	—	Social science selection	3
	12		—
			12
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credit</i>
Mng.T. 801, Coal Mining Technology	3	Engl. 826, Report Writing	3
Mng.T. 802, Mine Ventilation	3	Mng.T. 809, Mine Machinery Hydraulics	3
Mng.T. 808, Mine Power Distribution	3	Mgmt. 800, Principles of Management	3
Mng.T. 806, Mine Management and Law	3	Mng.T. 811, Practicum in Mine Maintenance	3
	—		—
	12		12



ASSOCIATE DEGREE MAJORS

PRODUCTION OPTION

FIRST TERM		SECOND TERM	
Econ. 14, Principles of Economics	Credits 3	Cmp.Sc. 1, Basic Computer Programming	Credits 1
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
Math. 801, Technical Mathematics	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Mng.T. 800, Mining Technology Orientation	1	Math. 802, Technical Mathematics	3
	—	Phys. 150, Technical Physics	3
	10		—
			12
THIRD TERM		FOURTH TERM	
Chem. 11, Introductory Chemistry	Credits 3	G.Sc. 1, Physical Geology; or G.Sc. 20, Our Earth; or G.Sc. 30, Physical and Historical Geology	Credits 3
E.Mch. 811, Elementary Mechanics	3	Min.E. (Metal.) 61, Introduction to Coal Preparation	3
Mng.T. 804, Mine Plant Technology	3	Humanities selection	3
Sp.Com. 200, Effective Speech	3	Social science selection	3
	—		—
	12		12
FIFTH TERM		SIXTH TERM	
Mng.T. 801, Coal Mining Technology	Credits 3	Engl. 826, Report Writing	Credits 3
Mng.T. 802, Mine Ventilation	3	Mng.T. 803, Strata Control	3
Mng. 30, Introduction to Mining Engineering	3	Mng.T. 805, Mine Systems Technology	3
Mng. 806, Mine Management and Law	3	Mng. 23, Mineral Land and Mine Surveying	3
	—		—
	12		12

## NUCLEAR ENGINEERING TECHNOLOGY

This major is designed to provide technically trained personnel to support the rapidly developing nuclear industry between the levels of high school graduate and professional engineer. The wide scope of training prepares the nuclear technician to assist the professional engineer in research, development, testing, manufacture, and maintenance through a career in radiation safety, reactor operations, radioisotope handling, nuclear and control instrumentation, fuel fabrication, and health physics.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 801, Fundamentals of D.C. Circuits	3
Engr. 2, Engineering Orientation	1	E.E. 809, D.C. Circuits Laboratory	2
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	—		—
	12		12
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Nuc.E. 800, Nuclear and Atomic Science	2
E.E. 814, Electrical Circuits	4	Nuc.E. 805, Principles of Measurement	3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3	Social science selection	3
Math. 803, Technical Calculus	3	Sp.Com. 200, Effective Speech	3
	—		—
	13		11
FIFTH TERM	<i>Credits</i>	+ SIXTH TERM	<i>Credits</i>
*Engl. 826, Report Writing	3	Nuc.E. 803, Elements of Nuclear Power Generation	3
M.E. 807, Heat Transfer	3	Nuc.E. 804, Introduction to Reactor Technology	3
Nuc.E. 801, Radiological Safety	2	Nuc.E. 812, Nuclear Technology Laboratory	3
Nuc.E. 802, Elements of Nuclear Technology	2	Nuc.E. 814, Reactor Technology Laboratory	3
Humanities selection	3		—
	—		—
	13		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

+Sixth term is to be taken at the University Park Campus.

ASSOCIATE DEGREE MAJORS

NURSING

This major prepares graduates to practice technical nursing in hospitals or similar health care organizations. After earning the degree of Associate in Nursing, students may write the State Board Test Pool Examination for licensure as registered nurses.

Clinical nursing courses are systematically integrated into the associate degree nursing program. The clinical facilities of Hamot Medical Center and other health care institutions in the metropolitan Erie area are utilized. A total of 77 credits are required for graduation.

Students are responsible for arranging transportation to clinical facilities.

FIRST TERM	Credits	SECOND TERM	Credits
Biol. 29, Mammalian Anatomy	4	Biol. 41, Physiology	3
Psy. 2, Psychology	3	Micrb. 6, Elementary Microbiology	2
Nurs. 800, Foundations of Technical Nursing I	6	Micrb. 7, Elementary Microbiology Laboratory	1
	—	Nurs. 801, Foundations of Technical Nursing II	6
	13		—
			12
THIRD TERM	Credits	FOURTH TERM	Credits
*Engl. 10, Composition and Rhetoric I; or Engl. 4, Basic Writing Skills	3	Nurs. 802, Techniques of Nursing in Childhood	7
+Psy. 13, Introduction to Developmental Psychology	3	Sp.Com. 200, Effective Speech	3
Nurs. 805, Techniques of Nursing the Patient in Senescence	7	‡Nurs. 806, Nursing Seminar	3
	—		—
	13		13
FIFTH TERM	Credits	SIXTH TERM	Credits
Nurs. 803, Techniques of Nursing the Mature Patient	7	Nurs. 804, Techniques of Nursing the Patient in the Middle Years	7
**Selections	6	**Selections	6
	—		—
	13		13

\*Students will be placed in Engl. 4 or Engl. 10 on the basis of the English Placement Test scores.  
+Psy. 13 must be completed by the end of the third term.  
\*\*Three credits must be in arts and humanities. It is recommended that 3 credits be in Chem. 11 if the student has not completed a high school chemistry course and that the remaining credits be taken in the areas of anthropology, chemistry, English, individual and family studies, nutrition, physics, psychology, or sociology.  
‡Nurs. 806 may be taken only after completion of the first year of the program.

## RECREATION AND PARKS

Graduates of this major, which prepares students to assume leadership roles with recreation program participants, may organize and lead recreation activities in program areas such as sports, performing arts, or nature and camping. The graduate may supervise such facilities as community centers, parks, special sports centers, and nature centers in a variety of settings, e.g., municipal recreation and park departments, youth-serving agencies, hospitals, schools, nursing homes, and private or commercial agencies. A total of 64 credits are required for the associate degree.

### RECREATION LEADERSHIP OPTION

	<i>Credits</i>
I. General Education (38 credits)	
A. Communication skills	9
Engl. 4 or 10 (3)	
Engl. 10 or 20 (3)	
Sp.Com. 200 (3)	
B. Science	6
6 credits selected from: Biol. 11; Bi.Sc. 1, 3, 4; Chem. 11;	
G.Sc. 20; Math. 800; Ph.Sc. 7	
C. Arts and humanities	9
A.Ed. 14 (3)	
Thea. 104 (3)	
Thea. 806 (3)	
D. Social and behavioral sciences	6
Psy. 2 or 37 (3)	
Soc. 1 or 5 (3)	
E. Health and physical education	8
Hl.Ed. 303 (2)	
Ph.Ed. 5 (3)	
Team sports	
Lifetime sports	
Swimming	
Ph.Ed. 803, Games for Children (1)	
Ph.Ed. 804, Dance and Gymnastics (1)	
Ph.Ed. 807, Adapted Activities (1)	
II. Requirements for the Major (20-21 credits)	20-21
Rc.Pk. 120, Man and Leisure (3)	
Rc.Pk. 130, Outdoor Living Skills (1)	
Rc.Pk. 150, The Scope of Recreation and Parks Services (1)	
Rc.Pk. 190, The Role of the Recreation and Parks Professional (1)	
Rc.Pk. 230, Camp Counseling (2); or Rc.Pk. 877, Therapeutic Recreation Program (3)	
Rc.Pk. 236, Theory and Practice of Recreation Leadership (3)	
Rc.Pk. 850, Field Practicum (3)	
Rc.Pk. 856, Recreation Program Planning (3)	
Rc.Pk. 875, Introduction to Therapeutic Recreation (3)	
III. Electives (5-6 credits)	5-6



ASSOCIATE DEGREE MAJORS

RETAILING

This major, which trains for positions in retail stores, provides a minimum foundation of a general education, a basis for understanding customer wants and needs, and a technical knowledge of retail procedures. It includes one term of supervised store experience. The major constitutes a well-balanced program for individual growth and development as well as for specialized employment training.

	Credits
I. General Education Requirements (21 credits)	
A. Communication skills	
6 credits in English, Sp.Com. 200	9
B. Biological and physical sciences	
A minimum of 3 credits in each area	6
C. Arts and humanities	
3 credits from either area	3
D. Social and behavioral sciences	
Selected with adviser's approval	3
II. Requirements for the Major (45 credits)	
A. Courses in retailing	
Mktg. 804, 805, 806; H.Dev. 321; M.E.R. 213, 214, 301; Rtl. 840, 850	29
B. Courses in individual development	
I.F.S. 16 (1) plus adviser's recommendations for other college courses	7
C. Professional selections	
Selected with adviser's approval	9

## SOCIOLOGY

This major introduces to students the study of human groups and their relationships to each other and to the environment; it enables students to gain some proficiency in the scientific study of group structures and processes. A further objective is to help students become more skillful in working with community institutions, agencies, and organizations either through gainful employment or as a volunteer.

	<i>Credits</i>
I. General Education (35 credits)	
A. Speaking and writing skills	9
Engl. 10 and 20 (6)	
Sp.Com. 200 (3)	
B. Mathematics	3
Math. 4, 5, 6, and 10 are not acceptable	
C. Science	6
Three credits in each of two groups listed below:	
a. Chemistry, physical science, physics	
b. Biological science, biology, botany, psychology, zoology	
c. Astronomy, biochemistry, genetics, geological science, meteorology, microbiology, physical geography	
d. Computer science, statistics, symbolic logic (Phil. 12 or 212 only)	
D. Arts	3
E. Humanities	6
F. Physical education	2
G. Social and behavioral sciences	6
(Not to include sociology)	
II. Requirements for the Major (18 credits)	18
Soc. 1 (3)	
Soc. 3 or 5 (3)	
Soc. 7 (3)	
*Additional credits in sociology (9)	
III. +Electives (7 credits)	7

Total minimum credits required for the associate degree: 60

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\*Selected in consultation with the student's adviser to reflect the student's career and/or basic interests.

+ For students planning to transfer to the B.A. program in either sociology or social welfare, one college-level course in a foreign language must be passed with at least a grade of C. It is also recommended that University Baccalaureate Degree Requirements be considered in so far as practical.

## ASSOCIATE DEGREE MAJORS

### STEEL TECHNOLOGY

This program prepares students for positions in the metallurgical and metals-oriented industries as technical personnel in research laboratories and in quality control, as supervisors of service groups, and as foremen of production operations.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3-4
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Chem. 14, Experimental Chemistry	1
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
Engr. 2, Engineering Orientation	1	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	—		—
	12		11-12
THIRD TERM	<i>Credits</i>		
Metal. 800, Metallurgical Laboratory Practice	4		
Metal. 804, Plant Trips; or Metal. 805, Metallurgical Operations	1		
Phys. 150, Technical Physics	3		
Social science selection	3		
	—		
	11		
SUMMER TERM	<i>Credits</i>		
Mat.T. 804, Summer Field Practice (4); or I.E. 812, Manufacturing Processes (3)	3-4		
		FOURTH TERM	<i>Credits</i>
		E.E. 800, Applied Electricity	2
		G.Sc. 1, Physical Geology; or G.Sc. 20, Our Earth	3
		Metal. 801, Ferrous Metallurgy	3
		Phys. 151, Technical Physics	3
			—
			11
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Geog. 26, Human Geography; or Econ. 14, Principles of Economics	3	I.E. 809, Inspection and Quality Control	3
Humanities selection	3	Mat.T. 803, Materials Testing	4
Metal. 803, Nonferrous Metallurgy	3	Metal. 802, Physical Metallurgy	3
Sp.Com. 200, Effective Speech	3	Metal. 804, Plant Trips; or Metal. 805, Metallurgical Operations	1
	—		—
	12		11

\*Students will be placed in Engl. 4 or Engl. 10 on the basis of English Placement Test scores.

## SURVEYING TECHNOLOGY

The objectives of the major are to provide a knowledge of the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys, and to develop trained personnel who understand the relation between the precision of measurements and the interpretation of data in addition to having an appreciation of the skills and equipment needed to make precise measurements in the field of surveying.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	*Engl. 4, Basic Writing Skills;	
Engr. 2, Engineering Orientation	1	or Engl. 10, Composition and Rhetoric I	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	<hr/> 12		<hr/> 11
THIRD TERM	<i>Credits</i>		
C.E. 812, Curves and Earthwork	3		
C.E. 818, Route Surveying	2		
Cmp.Sc. 1, Basic Computer Programming	1		
*Engl. 10, Composition and Rhetoric I;			
or Engl. 20, Composition and Rhetoric II	3		
Math. 803, Technical Calculus	3		
	<hr/> 12		
SUMMER TERM	<i>Credits</i>		
C.E. 813, Practical Field Problems	4		
		FOURTH TERM	<i>Credits</i>
		C.E. 816, Special Surveys	3
		C.E. 817, Cartographic Techniques	2
		E.G. 12, Spatial Analysis	2
		E.Mch. 810, Basic Mechanics	2
		Sp.Com. 200, Effective Speech	3
			<hr/> 12
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
C.E. 810, Statistics and Least Squares	3	C.E. 815, Geodetic Surveying	3
C.E. 814, Photogrammetry	3	C.E. 890, Legal Aspects of Surveying	2
*Engl. 826, Report Writing	3	Humanities selection	3
Pl.Sc. 1, American National Government	3	Technical selection	2-3
	<hr/> 12		<hr/> 10-11

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.



ASSOCIATE DEGREE MAJORS

WILDLIFE TECHNOLOGY

This program will prepare a student in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and care, maintenance, and propagation of animals. They will support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research.

FIRST TERM		SECOND TERM	
E.G. 10, Introductory Engineering Graphics	Credits 1	C.E. 809, Topographic Drawing	Credits 2
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I; or Engl. 826, Report Writing	3
For. 802, Dendrology	2	Math. 801, Technical Mathematics I	3
Wildl. 801, Introduction to Wildlife Management	3	Wildl. 804, Wildlife Mensuration	3
	<hr/> 9		<hr/> 11
THIRD TERM			
Wildl. 803, Animal Identification	Credits 3		
Wildl. 812, Wildlife Field Surveys	3		
Wildl. 814, Habitat Management	3		
	<hr/> 9		
SUMMER TERM			
Wildl. 805, Field and Laboratory Techniques	Credits 3		
Wildl. 806, Operational Procedures and Equipment	2		
	<hr/> 5		
		FOURTH TERM	
		Sp.Com. 200, Effective Speech	Credits 3
		For. 808, Forest Protection	3
		Wildl. 807, Outdoor Recreation	3
		Social science selection	3
			<hr/> 12
FIFTH TERM		SIXTH TERM	
For. 812, Elements of Project Supervision in Forestry	Credits 3	Acctg. 816, Introductory Accounting Survey	Credits 3
Wildl. 809, Animal Care	3	Human. 801, Science, Technology, and Human Values	3
Wildl. 811, Aerial Photo Interpretation	4	Wildl. 813, Fisheries Management for Technicians	3
	<hr/> 10		<hr/> 9

# COURSE DESCRIPTIONS

## CREDITS AND HOURS

A credit requires three 75-minute periods per week of an average student's time. The distribution of that time between class activities (such as lecture, recitation, laboratory, field trips, etc.) and outside preparation varies from course to course.

Credits, classroom work, and laboratory work are indicated by three numbers in parentheses immediately following the course title.

1. The first number shows the maximum course credits and therefore the total time required by the course per week. For example, a 2-credit course normally requires 7½ hours per week for class activity and individual preparation.
2. The second number shows the periods of classroom work (a period is 75 minutes), including lecture, recitation, class discussion, demonstration, or various combinations of these.
3. The third number shows the periods of practicum room work (a period is 75 minutes), including laboratory, shop work, studio, drafting room, field trips, etc.

Courses numbered from 800 to 899 are reserved for the associate degree majors. Credit received for 800-series courses is not applicable to any baccalaureate degree program offered by the University with the exception of programs offered by Capitol Campus. Courses numbered from 1 to 399 carry baccalaureate credit and are required in most of the associate degree majors. Elective credit courses vary from campus to campus and term to term. Information regarding such offerings may be obtained from the *Schedule of Classes* for the various campuses.

## ACCOUNTING (ACCTG)

16. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Accounting for proprietorships, partnerships, and corporations for retailers and manufacturers; financial statement analysis. Students who have passed Acctg. 101 may not schedule this course.

101. INTRODUCTORY FINANCIAL ACCOUNTING (3:2:1½) Fundamentals of the collection, recording, summarization, and interpretation of accounting data.

102. INTRODUCTORY MANAGERIAL ACCOUNTING (3:2½:1) Actual and standard cost systems; managerial uses of cost data. Prerequisite: Acctg. 101.

801. INTRODUCTORY ACCOUNTING (3:2:1)

802. INTRODUCTORY ACCOUNTING (3:2:1) Prerequisite: Acctg. 801.

803. INTERMEDIATE ACCOUNTING (3:3:0) Financial accounting statements, concepts, and procedures; assets, liabilities, owners' equity, statement analysis. Prerequisite: Acctg. 802.

806. FEDERAL TAX ACCOUNTING (3:3:0) Federal tax revenue system as it affects the individual and business; tax planning, research and preparation of returns. Prerequisite: Acctg. 802.

807. MANAGERIAL ACCOUNTING (3:3:0) Cost and budgetary control; preparation of information for decision making. Prerequisite: Acctg. 802.

816. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Fundamentals of accumulation and summarization of accounting data; emphasis on financial statement analysis and the uses of accounting in business.

## COURSE DESCRIPTIONS

### **AEROSPACE ENGINEERING TECHNOLOGY (AERSP)**

800. **APPLIED AERODYNAMICS (3:3:0)** Fluid mechanics; characteristics of wings and airfoils, drag estimation, aircraft performance and static stability. Prerequisite: Phys. 151.
802. **AIRCRAFT STRUCTURAL ANALYSIS (3:3:0)** Truss analysis; shear flow; thin-webbed beams; box beams; semimonocoque structures; joints and fittings; members in tension and compression. Prerequisite: E.Mch. 813.
803. **TECHNICAL AERODYNAMICS (3:3:0)** Potential flow; airfoil theory, vortex systems, wing theory, viscous flow, boundary layers. Prerequisite: Aersp. 800.
804. **AIRCRAFT PROPULSION (3:3:0)** Piston and turbine engines; thermodynamics; propellers; compressor and turbine design; operating characteristics; chemical rockets. Prerequisite: Aersp. 803.
806. **COMPUTER APPLICATIONS TO AEROSPACE ENGINEERING (3:1:5)** Digital and analog computer programming, application to aircraft performance, stability and control, nonlinear and simultaneous differential equations. Prerequisite: Cmp.Sc. 1. Concurrent: Aersp. 800.
807. **AIRCRAFT STRUCTURAL DESIGN (3:1:4)** Aerodynamic and inertia loads; aircraft materials; fasteners; design of components; design layout. Prerequisites: Aersp. 802, 803.
808. **ELECTRONIC INSTRUMENTATION (3:1:5)** Electrical measurements, power supplies, amplifiers, oscillators, servo systems, operational amplifiers, switching and counting systems. Prerequisite: E.E. 800.
809. **AEROSPACE LABORATORY (2:1:3)** Velocity measurements; force measurements; subsonic wind tunnel testing; static and dynamic structural testing; flight testing. Prerequisite: Aersp. 800.
810. **PRINCIPLES OF FLIGHT (3:2:3)** Airplane principles, navigation, meteorology, F.A.A. regulations; airplane performance, flight experiments, flight instruction. Prerequisite: Aersp. 800.
830. **SELECTED TOPICS IN AEROSPACE ENGINEERING TECHNOLOGY (3)** Individual or group work in aerospace engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

### **AGRICULTURAL ECONOMICS (AG EC)**

800. **THE AGRICULTURAL ECONOMY (3:3:0)** A survey of the agricultural economy; nature, scope and trends of ag-industry; and agriculture in the national perspective.
801. **MANAGEMENT OF COMMERCIAL FARMS (3:2:2)** Methods of analysis to determine farm organization, and profitability of alternate enterprises, capital investments, and use of production resources.
882. **AGRICULTURAL MARKETING AND SALES (3:3:0)** Marketing channels, services, costs, and price relationships involved in distributing farm supplies and agricultural products.
803. **INTRODUCTION TO AGRICULTURAL BUSINESS (3:3:0)** Economic principles which determine the supply, demand, and price of agricultural products and provide methodology for management decisions.

### **AGRICULTURAL ENGINEERING (AG E)**

800. **FARM POWER (2:1:2)** Principles and performance characteristics of tractors, electric motors, and other power units; application and maintenance of farm power equipment.
801. **FARM STRUCTURES AND UTILITIES (3:2:2)** Planning for efficient utilization of buildings, power, and equipment for materials handling and environmental control in agricultural production and processing.

## ANIMAL SCIENCE (AN SC)

800. **LIVESTOCK PRODUCTION (2:1:2)** The livestock and meat industry in the United States; management of commercial beef, swine, and sheep enterprises.
801. **POULTRY PRODUCTION (2:1:2)** Practical aspects of poultry nutrition, management, disease control, and marketing in the production of broilers, eggs, and turkeys.
802. **DAIRY PRODUCTION (2:1:2)** The feeding, management, breeding, milking, disease control, and housing of dairy cattle; economic factors contributing toward the enterprise.

## ARCHITECTURAL ENGINEERING TECHNOLOGY (A E)

801. **BUILDING MATERIALS (2:2:0)** Structural and architectural use of building materials and construction assemblies.
802. **METHODS OF CONSTRUCTION I (3:0:9)** Materials and methods of construction used in buildings, as expressed in drawings. Prerequisites: A.E. 801, E.G. 3.
803. **PLUMBING, FIRE PROTECTION AND ELECTRICAL LAYOUT (3:1:6)** Layout of plumbing, fire protection and electrical distribution in buildings to meet code and usage requirements. Prerequisite or concurrent: A.E. 802.
804. **HEATING, VENTILATING AND AIR CONDITIONING LAYOUT (3:1:6)** Fundamental calculations and layout of systems in buildings. Prerequisite: A.E. 803.
805. **ARCHITECTURAL RENDERING (2:0:6)** Architectural rendering techniques, including use of shade and shadow; color. Prerequisite: E.G. 3.
807. **METHODS OF CONSTRUCTION II (2:0:6)** Integration of materials and systems in working drawings. Prerequisites: A.E. 802, 809.
808. **GRAPHIC ANALYSIS (2:0:6)** Graphical analysis of force systems, centers of gravity, stresses in framed structures, arches, walls, moments and deflections of beams. Prerequisites: E.G. 12, E.Mch. 811.
809. **STRUCTURE DESIGN (3:1:6)** Elementary principles of structural design and detailing in timber, steel, and reinforced concrete; use of handbooks; fundamentals of structural and architectural drafting. Prerequisites: E.G. 803, E.Mch. 813.
810. **ARCHITECTURAL ENGINEERING OFFICE PRACTICE (2:2:0)** Procedures involved in production of contract documents, both drawings and specifications. Prerequisite: sixth-term standing.
812. **BUILDING LIGHTING AND ACOUSTICS (3:2:2)** Fundamentals of lighting layout and calculations; fundamentals of building acoustics and noise control; studio-laboratories. Prerequisites: Phys. 151, Math. 803.
830. **SELECTED TOPICS IN ARCHITECTURAL ENGINEERING TECHNOLOGY (3)** Individual or group work in architectural engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ART EDUCATION (A ED)

14. **INTRODUCTORY CRAFTS FOR TEACHERS (3:1:5)** Direct experience with materials such as wood, clay, metal, paper, textiles, and plastics in relationship to the creative needs of children.
806. **ARTS AND CRAFTS (3:1:5)** An introduction to arts and crafts processes, experiences, and materials appropriate for community centers, playgrounds, etc.; designed for recreation leadership.



## COURSE DESCRIPTIONS

### ART HISTORY (ART H)

100. INTRODUCTION TO ART (3:3:0) An approach to the understanding of art through a critical analysis of selected works of architecture, painting, and sculpture. Students who have passed Art H. 110 may not schedule this course.

110. SURVEY OF WESTERN ART (3:3:0) General survey of major developments in architecture, painting, and sculpture in the Western world. Students who have passed Art H. 100 may not schedule this course.

305. MODERN PAINTING (3:3:0) The development of painting from the French Revolution to the present.

307. AMERICAN ART (3:3:0) History of art in the English colonies and the United States from the seventeenth century to the present.

### THE ARTS (ARTS)

1. THE ARTS (3:3:0) Developing perception in the arts through relating the visual, musical, performing and environmental arts.

### BIOCHEMISTRY (B CHEM)

100. CLINICAL CHEMISTRY FOR MEDICAL LABORATORY TECHNICIANS (6:3:6) Theoretical and practical concepts associated with clinical chemistry testing procedures used in the diagnosis of human diseases. Prerequisite: Chem. 34.

### BIOLOGICAL SCIENCE (BI SC)

1. STRUCTURE AND FUNCTION OF ORGANISMS (3:3:0) Origin, development, and cellular basis of life; fundamental principles, processes and structures of organisms. Students who have passed Biol. 11, 12, 13, 27, or 41 may not schedule this course.

2. EVOLUTIONARY RELATIONSHIPS OF ORGANISMS (3:3:0) Examination of the biological world in terms of reproduction, genetics, evolution, development, diversity; interrelationships and interdependence of organisms, populations, communities. Students who have passed Biol. 11, 12, 13, 22, or 33 may not schedule this course.

3. MAN AND HIS ENVIRONMENT (3:3:0) Kinds of environments; past and present uses and abuses of natural resources; disposal of man's wastes; prospects for the future. Students who have passed Biol. 210 or any other upper-level ecology course in biology may not schedule this course.

4. BIOLOGY OF MAN (3:3:0) A general survey of structure and function in man—from conception, through growth and reproduction, to death. Students who have passed Biol. 29 and 41 may not schedule this course.

### BIOLOGY (BIOL)

11. LIFE SCIENCE (3:2:2) Structure, metabolism, development, reproduction, and evolution of plants and animals.

29. MAMMALIAN ANATOMY (4:2:4) Anatomy of a mammal, with special reference to that of man. Students who have passed Biol. 421 may not schedule this course.

41. PHYSIOLOGY (3:3:0) Normal functions of the animal body, with special reference to those of man. Students who have passed Biol. 472 may not schedule this course.

## BIOMEDICAL EQUIPMENT TECHNOLOGY

42. **PHYSIOLOGY LABORATORY (1:0:2)** Experiments demonstrating basic physiological principles with special reference to man. Prerequisite or concurrent: Biol. 41.

### BIOMEDICAL EQUIPMENT TECHNOLOGY (B E T)

801. **PHYSIOLOGICAL TRANSDUCERS (3:2:2)** Study of the principles of operation and applications of devices used for the conversion of physiological events to electrical signals. Concurrent: E.E. 816.

802. **BIOMEDICAL INSTRUMENTATION AND SYSTEMS (3:2:2)** Introduction to the operating principles, calibration, and maintenance of biomedical instruments and systems with special emphasis given to patient safety. Prerequisite: B.E.T. 801.

803. **BIOMEDICAL EQUIPMENT LABORATORY (INTERNSHIP) (4:1:6)** This course is intended to provide practical experience, within the hospital environment, on a variety of biomedical instruments. Prerequisites: B.E.T. 802, M.E. 881, Biol. 41.

830. **SELECTED TOPICS IN BIOMEDICAL EQUIPMENT TECHNOLOGY (3)** Individual or group work in biomedical equipment technology for students with specific occupational objectives. Prerequisite: fourth-term standing.

### BUSINESS ADMINISTRATION (B A)

803. **COOPERATIVE PRACTICUM WITH BUSINESS OFFICES (6:0:12)** Cooperative practical work with business offices under the supervision of the instructor.

### BUSINESS LAW (B LAW)

843. **INTRODUCTION TO BUSINESS LAW (3:3:0)** Legal institutions; basic legal principles pertaining to individual and contractual rights, with special emphasis on business operations and transactions.

850. **REAL ESTATE LAW (3:3:0)** Basic legal principles involved in the negotiation of real estate transactions. Prerequisite: B.Law 843.

### BUSINESS LOGISTICS (B LOG)

102. **PHYSICAL DISTRIBUTION (3:3:0)** Physical distribution function in business; role played by transportation, warehousing, location, inventory control; concept of a business logistics system. Prerequisite: fourth-term standing.

104. **TRANSPORT SYSTEMS (3:3:0)** Conceptual model of a transport system; environmental relationships; modal components and internal constraints, with special application to the United States. Prerequisite: fourth-term standing.

206. **TRAFFIC MANAGEMENT (3:3:0)** Analysis of the traffic function in the logistics system. Evaluation of routes, rates and shipping document procedures. Prerequisite: B.Log. 102 or 104.

### CHEMICAL ENGINEERING TECHNOLOGY (CH E)

800. **TECHNICAL CALCULATIONS (3:3:0)** Engineering units and their conversion. Technique of solving elementary problems in industrial stoichiometry, material balances, and heats of reaction. Prerequisite or concurrent: Chem. 13 and 15.

## COURSE DESCRIPTIONS

802. CHEMICAL TECHNOLOGY (3:3:0) Introductory discussion and problems relating to flow of fluids and transfer of heat. Prerequisite: fourth-term standing.
803. CHEMICAL TECHNOLOGY (3:3:0) Elementary discussion and problems involving evaporation, distillation, and air-water interaction. Prerequisite: Ch.E. 800.
820. CHEMICAL TECHNOLOGY LABORATORY (4:2:6) Measurements in fluid flow, heat transfer, distillation, mass transfer; chemical analytical techniques; industrial laboratory report writing. Prerequisite or concurrent: Ch.E. 803.
830. INDUSTRIAL CHEMISTRY (3:3:0) The commercial preparation of important chemicals and derivatives with emphasis upon the chemistry involved and the flow of material. Prerequisite or concurrent: Chem. 13 and 15.
831. SELECTED TOPICS IN CHEMICAL ENGINEERING TECHNOLOGY (3) Individual or group work in chemical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## CHEMISTRY (CHEM)

11. INTRODUCTORY CHEMISTRY (3:2:2) Selected principles and applications of chemistry. Prior study of chemistry not assumed.
12. CHEMICAL PRINCIPLES (3-4) Basic concepts and quantitative relations. Prerequisite: Satisfactory performance on placement examination—students take Chem. 12 for 3 credits. Unsatisfactory performance on placement examination—students take Chem. 12 for 4 credits.
13. CHEMICAL PRINCIPLES (3:3:0) Continuation of Chem. 12, including an introduction to the chemistry of the elements. Prerequisite: Chem. 12. Prerequisite or concurrent: Chem. 14.
14. EXPERIMENTAL CHEMISTRY (1:0:3) Introduction to quantitative experimentation in chemistry. Prerequisite or concurrent: Chem. 12.
15. EXPERIMENTAL CHEMISTRY (1:0:3) Continuation of Chem. 14 with emphasis on analytical procedures. Prerequisite: Chem. 14. Prerequisite or concurrent: Chem. 13.
23. INTRODUCTION TO MODERN ANALYTICAL CHEMISTRY (4:2:4) Contemporary methods of chemical and instrumental analysis, including potentiometric titration, specific ion electrodes, spectrophotometry, and chromatography. Prerequisite: Chem. 15.
34. ORGANIC CHEMISTRY (3:3:0) Introduction to organic chemistry with emphasis on the properties of organic compounds of biochemical importance. Prerequisite: Chem. 11 or 12.
35. ORGANIC CHEMISTRY (3:2:4) Introduction to organic chemistry with emphasis on the identification of organic compounds by characteristic chemical reactions and by spectroscopy. Prerequisite: Chem. 34.
800. GENERAL CHEMISTRY (3:2:3) Basic principles of chemistry; properties and uses of some industrially important elements and compounds.

## CIVIL ENGINEERING TECHNOLOGY (C E)

809. TOPOGRAPHIC DRAWING (2:0:6) Conventional mapping symbols; constructing topographic maps from stadia notes; estimating grading quantities from topographic maps. Prerequisite: E.G. 1 or E.G. 10. Prerequisite or concurrent: C.E. 811 or Wildl. 812.
810. STATISTICS AND LEAST SQUARES (3:2:2) Frequency distribution; histograms; frequency polygons; measures of central tendency; dispersion; uses of normal curve; least



- squares applied to surveying problems. Prerequisite: Math. 803. Prerequisite or concurrent: C.E. 815.
811. PLANE SURVEYING (3:2:3) Theory of plane surveying; use, care, and adjustments of surveying equipment; traversing, areas, leveling, stadia, and plane table mapping. Prerequisite or concurrent: Math. 801.
812. CURVES AND EARTHWORK (3:2:3) Computation and laying out of horizontal and vertical curves; calculation of cut and fill; setting slope stakes for construction. Prerequisite or concurrent: C.E. 811, Math. 802.
813. PRACTICAL FIELD PROBLEMS (4) Geodetics, topography, field astronomy; route location; hydrographic surveys; land subdivision; use of electronic measuring devices. Prerequisites: C.E. 812, 818.
814. PHOTOGRAMMETRY (3:1:6) Interpretation and use of aerial photographs; mapping by photogrammetric methods; application of aerial and terrestrial photographic surveying to specific engineering problems. Prerequisite: C.E. 818.
815. GEODETIC SURVEYING (3:1:6) Precision vertical and horizontal control surveys; level nets; reciprocal leveling; triangulation; state plane coordinates; astronomic observations for azimuth and latitude. Prerequisites: C.E. 811, Math. 802.
816. SPECIAL SURVEYS (3:1:6) Applications of surveying in hydrography, mining, construction, and subdivision planning; surveying registration law and professional ethics. Prerequisites: C.E. 812, 813.
817. CARTOGRAPHIC TECHNIQUES (2:0:6) Use of tools and equipment; projections used in art, advertising, navigation, government maps; relief methods; scribing techniques; map reproduction methods. Prerequisite: C.E. 809.
818. ROUTE SURVEYING (2:0:5) Field and office operations connected with highway and railroad location; mass diagram as related to economical distribution of earthwork. Prerequisite: C.E. 811. Concurrent: C.E. 812.
821. CONCRETE TECHNOLOGY (3:2:3) Characteristics of Portland cement concrete, physical properties of constituent materials, testing procedures, basics of reinforced concrete. Prerequisite: E.Mch. 813.
822. SOIL MECHANICS (3:2:3) Identification, classification, sampling, testing, handling, and consolidation of soils for highway construction. Prerequisites: E.Mch. 810, Phys. 151.
823. HIGHWAY ORGANIZATION AND OPERATIONS (3:3:0) Fundamentals of technology; plans and specifications; drainage, cost, traffic studies, and highway safety. Prerequisite: second-year standing in Highway Engineering Technology.
824. ASPHALT TECHNOLOGY (3:2:3) The use and testing of asphaltic material as adapted to highways.
825. CONSTRUCTION ESTIMATING (3:3:0) Job organization, estimating, cost control, construction methods and equipment for highway construction projects.
830. SELECTED TOPICS IN CIVIL ENGINEERING TECHNOLOGY (3) Individual or group work in civil engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.
861. FLUID FLOW (3:3:0) Elementary theory of fluid flow: hydrostatics; flow through orifices, Venturi meters, and pipes; flow in open channels; theory of the centrifugal pump. Prerequisites: E.Mch. 810 or 811, Math. 802.
890. LEGAL ASPECTS OF SURVEYING (2:2:0) Legal principles affecting the determination of property boundaries; responsibilities of surveyors, attorneys, title companies, and the court. Prerequisite: C.E. 811.



## COURSE DESCRIPTIONS

### CLOTHING AND TEXTILES (CL TX)

835. PREPARATION FOR PRACTICUM (1:1:0) Analysis of employee responsibilities in an operating store situation; preparation for ten weeks of approved store experience. Prerequisite: third-term standing.

836. PRACTICUM (2) A minimum of ten weeks of practical store experience approved by the student's major adviser, including an acceptable written report. Prerequisites: Cl.Tx. 835, Com. 804, 805.

### COMMUNITY DEVELOPMENT (COM D)

7. INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0) An introduction to the study of community, community systems, and impact on the individual.

870. COMMUNITY LEADERSHIP (2:2:1) Principles and techniques of participation in voluntary community groups concerned with strengthening family and community life.

### COMPUTER SCIENCE (CMPSC)

1. BASIC COMPUTER PROGRAMMING (1:0:2) Fundamental characteristics of digital computers; organization and coding of problems for solution on digital computer. Prerequisite: 2 entrance units in mathematics.

44. TECHNIQUES OF ORGANIZATION (3:3:1) Programming sequential and random access devices. Methods of organizing, sorting, merging files on secondary storage devices. Prerequisite: Cmp.Sc. 140.

54. INTRODUCTION TO OPERATING SYSTEMS (3:3:1) Techniques in multiprogramming, queueing, scheduling, handling of interrupts from peripheral devices. Prerequisite: Cmp.Sc. 44.

64. CONTEMPORARY TRENDS IN COMPUTER PROGRAMMING (3:3:0) State of the technology in the design of data-language processors, information processing systems, and large production programs in EDP. Prerequisite: Cmp.Sc. 54.

101. INTRODUCTION TO ALGORITHMIC PROCESSES (3:3:0) Properties of algorithms, languages, and notations for describing algorithms; applications of a procedure-oriented language to problem solving. Students who have passed Cmp.Sc. 201, 203, 401, or 402 may not schedule this course. Prerequisite: 2 entrance units in mathematics.

102. COMPUTER ORGANIZATION AND PROGRAMMING (3:3:0) Computer components and organization, representation of numbers and characters, instruction codes, machine-language programming, assembly systems, input-output, subroutines, and macros. Students who have passed Cmp.Sc. 211 or 410 may not schedule this course. Prerequisite: Cmp.Sc. 101.

140. INTRODUCTION TO DATA PROCESSING (3:3:0) Applications of digital computers to problems in data processing with examples from accounting, record updating, inventory control, and report generation. Prerequisite: Cmp.Sc. 101.

804. UNIT RECORD PROCESSING (1:1:2) Principles and practices of unit record processing.

805. COMPUTER APPLICATION PROBLEM (1-3) The organization, flow charting, programming, debugging, and documentation of a major applied problem in a field of computer application. Prerequisite: fifth-term standing.

890. SPECIAL TOPICS IN COMPUTER PROGRAMMING (1-3) Application of any of several specific computer programming languages to problem solving. Prerequisite: Cmp.Sc. 101.

## ECONOMICS (ECON)

2. **INTRODUCTORY MICROECONOMIC ANALYSIS AND POLICY (3:3:0)** Methods of economic analysis and their use; economic aggregates; price determination; theory of the firm; distribution.

4. **INTRODUCTORY MACROECONOMIC ANALYSIS AND POLICY (3:3:0)** National income measurement; aggregate economic models; money and income; policy problems.

14. **PRINCIPLES OF ECONOMICS (3:3:0)** Analysis of the American economy, emphasizing the nature and interrelationships of such groups as consumers, business, governments, labor, and financial institutions. Students who have passed Econ. 2 or are registered in the College of Business Administration may not schedule this course.

315. **LABOR ECONOMICS (3:3:0)** An economic analysis of the labor market. Prerequisite: Econ. 2.

## ELECTRICAL ENGINEERING TECHNOLOGY (E E)

800. **APPLIED ELECTRICITY (2:1:3)** Fundamentals of electric circuits; basic principles of electrical machinery and devices; electrical-mechanical analogies; beginning electronics. Prerequisite: Math. 801.

801. **FUNDAMENTALS OF D.C. CIRCUITS (3:3:0)** Fundamental theory of resistance, current, voltage. Direct-current circuit concepts developed from simplest series circuit through loop analysis; Thevenin's theorem. Prerequisite: Math. 801.

804. **A.C. CIRCUITS (2:2:0)** Application of network theorems, laws, and methods to alternating-current circuits; balanced and unbalanced polyphase systems. Prerequisite: E.E. 814.

807. **A.C. AND ELECTRONICS LABORATORY (2:0:6)** Laboratory study of alternating-current circuits and semiconductors; assembly and tracing of electrical and electronic circuits. Must be taken with E.E. 804 and 810. Prerequisite: E.E. 818.

809. **D.C. CIRCUITS LABORATORY (2:0:4)** Introduction to electrical apparatus, including instruments, their interconnection into basic circuits, observation of circuit behavior, and report writing. Must be taken with E.E. 801.

810. **FUNDAMENTALS OF SEMICONDUCTORS (3:3:0)** Semiconductor physics and circuit theory including hybrid parameters; equivalent circuits; power amplifiers and frequency response of small signal amplifiers. Prerequisites: E.E. 814, Math. 803.

813. **FUNDAMENTALS OF ELECTRICAL MACHINES (3:2:2)** Direct-current machinery principles and applications; introduction to machines and basic concepts of laboratory methods related to machinery studies. Prerequisites: E.E. 814, 818.

814. **ELECTRICAL CIRCUITS (4:4:0)** Direct-current circuit analysis; introduction to basic magnetism and magnetic circuits; single-phase circuit fundamentals. Prerequisites: E.E. 801, Math. 802.

815. **A.C. MACHINERY AND CONTROL (4:4:0)** Alternating-current machinery principles and applications; survey of alternating- and direct-current machinery control methods. Prerequisites: E.E. 804, 813.

816. **LINEAR ELECTRONIC CIRCUITS (3:3:0)** Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, vacuum tubes and operational amplifiers. Prerequisite: E.E. 810.

817. **ADVANCED ELECTRONICS (4:4:0)** Fundamentals and application of pulse and digital circuits and electronic devices, such as unijunction transistors, photo devices, and zener diodes. Prerequisite: E.E. 816.

818. **ELECTRICAL CIRCUITS LABORATORY (1:0:2)** Laboratory study of direct-current networks and alternating-current circuits. Must be taken with E.E. 814. Prerequisite: E.E. 809.

## COURSE DESCRIPTIONS

819. A.C. MACHINERY LABORATORY (1:0:2) Alternators, induction generators, single- and polyphase motors, synchro units; transformers, saturable reactors, and protective devices. Must be taken with E.E. 815. Prerequisite: E.E. 807.

820. ADVANCED ELECTRONICS LABORATORY (2:0:4) Laboratory study of solid state pulse, digital, industrial and motor control circuits. Must be taken with E.E. 817. Prerequisite: E.E. 821.

821. LINEAR ELECTRONICS LABORATORY (1:0:2) Laboratory study of transistors; study of differential and operational amplifiers. Emphasis is placed on circuit design. Must be taken with E.E. 816. Prerequisite: E.E. 807.

830. SELECTED TOPICS IN ELECTRICAL ENGINEERING TECHNOLOGY (3) Individual or group work in electrical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING (ENGR)

2. ENGINEERING ORIENTATION (1:0:2) Introduction to efficient methods for analyzing and solving engineering problems.

5. EXPERIMENTAL METHODS FOR ENGINEERS (1:0:2) Introduction to experimental methods used in engineering. Applications of basic experimental and computational concepts through student involvement in laboratory experiments.

801. INTRODUCTION TO ENGINEERING (0:1:0) Introduction to all functions and branches of engineering through general lectures.

## ENGINEERING GRAPHICS (E G)

1. ENGINEERING DRAWING (2:0:5) Technical skills and drafting room practices; fundamentals of theoretical graphics; orthogonal, oblique, and perspective projections; working and schematic drawings.

3. ARCHITECTURAL GRAPHICS (2:0:6) Principles of architectural drawing: spatial relationships of points, lines, planes, and solids with architectural applications; shadows, perspective.

10. INTRODUCTORY ENGINEERING GRAPHICS (1:0:3) Multiview projections, pictorials, space analysis, graphs, graphical mathematics.

11. ENGINEERING DESIGN GRAPHICS (1:0:3) Introduction to creative design; design implementation and working drawings, vector analysis, dimensioning and engineering standards. Prerequisite: E.G. 10.

12. SPATIAL ANALYSIS (2:0:5) Spatial relations of points, lines, and solids, with engineering applications. Prerequisite: 1 credit of introductory graphics.

800. DRAWING ROOM STANDARDS AND PRACTICES (2:0:6) Interpretation of various types of engineering drawings, including dimensional systems, symbols, and American standard drafting room practices. Prerequisite: E.G. 10.

803. ADVANCED ENGINEERING DRAWING (3:1:6) Application of principles of engineering drawing, including auxiliary views in the layout of detail, assembly, and working drawings. Prerequisite: E.G. 1.

830. SELECTED TOPICS IN ENGINEERING GRAPHICS (1-3) Individual or group work in engineering graphics offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.



**ENGINEERING MECHANICS (E MCH)**

810. **BASIC MECHANICS (2:2:0)** Forces; moments; resultants; equilibrium of force systems; introduction to dynamics. Prerequisite: Math. 801.
811. **ELEMENTARY MECHANICS (3:3:0)** Forces; moments; resultants; equilibrium of force systems; friction; centroids and moment of inertia of areas; dynamics of particles. Prerequisite: Math. 801.
812. **INTRODUCTION TO DYNAMICS (3:2:2)** Absolute and relative motion related to particles and simple linkages. Force-mass-acceleration, work-energy, and impulse-momentum solution techniques. Prerequisite: 3 credits of E.Mch. 811. Prerequisite or concurrent: Math. 803.
813. **STRENGTH AND PROPERTIES OF MATERIALS (3:3:0)** Axial stress and strain; shear; riveted and welded connections; torsion; beam stresses and deflections; combined axial and bending stresses; columns; ductility, resilience, and toughness. Prerequisite: E.Mch. 811.

**ENGLISH (ENGL)**

- \*4. **BASIC WRITING SKILLS (1-3)** Intensive instruction in grammar, usage, and punctuation, and practice in writing sentences and paragraphs. Designed for students with deficient preparation. This course will not be acceptable as satisfying the communications category of the associate or Baccalaureate Degree Requirements.
10. **COMPOSITION AND RHETORIC I (3:3:0)** Organizing and writing clear expository essays. Prerequisite: satisfactory English Placement Test scores or Engl. 4 (3 credits) or concurrent with Engl. 4 (1 credit). Prerequisite: Engl. 4 or satisfactory performance on English Proficiency Examination.
20. **COMPOSITION AND RHETORIC II (3:3:0)** Building and presenting cogent written arguments, with attention to style. Prerequisite: Engl. 10.
30. **HONORS FRESHMAN COMPOSITION (3:3:0)** Writing practice for specially qualified and screened students. Students who are exempt from Engl. 10 and have passed a special writing test will qualify for this course.
826. **REPORT WRITING (3:3:0)** Interpretation of statistical data and writing of technical reports. Prerequisite: Engl. 4 or 10.

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\*Although open to all students, it is especially designed to precede or supplement Engl. 10. Enrollment *either* on the basis of test scores, at the beginning of the term (3 credits), *or* from the first through sixth weeks of the term (1 credit).

**FINANCE (FIN)**

108. **PERSONAL FINANCE (3:3:0)** Personal management of budgets, bank accounts, loans, credit buying, insurance, real estate and security buying. May not be scheduled by College of Business Administration students. Prerequisite: fourth-term standing.
210. **COMMERICAL BANK MANAGEMENT (3:3:0)** Fundamental principles underlying management of a commercial bank; capital funds; asset and liability management; value maximization; legal and operational constraints. Prerequisite: Fin. 105.
807. **BANKING AND CORPORATE FINANCE (3:3:0)**



## COURSE DESCRIPTIONS

### FOOD SERVICE AND HOUSING ADMINISTRATION (FS HA)

50. IN-SERVICE TRAINING (0-1) Eight weeks or 300 hours of practical experience in operations of the type in which the student is majoring.

102. INTRODUCTION TO FOOD SERVICE AND HOUSING ADMINISTRATION (3:3:0) Professional duties of management personnel in large food and housing operations, their working conditions, and organizations which they serve.

103. INTRODUCTION TO HEALTH FACILITIES FOOD SERVICE ADMINISTRATION (3:3:0) Professional functions of the hospital food service system, relationships with the nutrition component of food service system, and organization served.

225. FOOD AND LABOR MANAGEMENT AND CONTROL (3:3:0) Techniques for analyzing and controlling costs in hospitality organizations. Prerequisite: 3 credits in accounting.

320. HOSPITALITY INDUSTRY EQUIPMENT AND UTILITIES (3:3:0) Principles governing the purchase, use and operation of heating, plumbing, refrigeration, air conditioning and other equipment and utilities.

321. HOSPITALITY INDUSTRY MAINTENANCE (2:2:0) Maintenance management in hospitality operations.

### FORESTRY (FOR)

800. INTRODUCTION TO FORESTRY (1:0:3) Introduction to the several branches of forestry through lectures, demonstrations, and field practice.

802. DENDROLOGY (3:0:9) Taxonomy of woody plants; their field identification; the geographic distribution of the important forest trees of the United States.

803. DENDROLOGY (2:0:6) Continuation of For. 802 with emphasis on the taxonomy of the angiosperms. Prerequisite: For. 802.

804. FOREST MENSURATION (3:2:3) Measurement of forests and forest products.

806. FOREST INVENTORIES (3:2:3) Application of land surveying and sampling techniques, including statistical analysis, for the determination of timber volume and growth.

807. FOREST RECREATION (3:2:3) Development, construction, and management of forest recreation areas and facilities. Prerequisite: For. 815.

808. FOREST PROTECTION (3:2:3) Forest fire prevention, detection, behavior, and suppression; fire plans and statistics; insect and disease control.

809. FOREST VALUATION (3:2:3) Determination of forest values through a consideration of markets, logging and milling costs, stumpage appraisals, and other forest values. Prerequisites: For. 806, 813.

810. FOREST IMPROVEMENTS (3:2:3) Use of materials and equipment in developing, operating, and maintaining the forest property.

811. FOREST PHOTO INTERPRETATION (4:2:6) Application of aerial photo interpretation techniques by forest technicians in land management. Prerequisite: For. 816.

812. ELEMENTS OF PROJECT SUPERVISION IN FORESTRY (3:3:0) Supervisory techniques and elements of project layout.

813. SUMMER FIELD PRACTICE (4) Concentrated field practice in selected elements of forestry, and introduction to field techniques in watershed, soils, and wildlife management. Prerequisite: For. 806.

814. FORESTRY LEADERSHIP PRACTICUM (1:0:3) Leadership techniques applied to standard forestry field operations. Prerequisite or concurrent: For. 812 and two terms of For. 800.

815. FOREST SURVEYING I (3:2:3) Basic plane surveying techniques as applied to forestry practices. Prerequisite or concurrent: Math. 801.

816. FOREST SURVEYING II (3:2:3) Standard mapping techniques as applied to field forestry situations. Prerequisite: For. 815.

817. URBAN FORESTRY (3:2:3) The application of land treatment techniques and forestry practices to urban environments. Prerequisites: For. 802, 807.
818. INDIVIDUAL STUDIES (1-3 per term) Individual study of forest technology.

## **GEOGRAPHY (GEOG)**

26. HUMAN GEOGRAPHY (3:3:0) Introduction to concepts, principles, and theories of spatial organization.

## **GEOLOGICAL SCIENCES (G SC)**

- \*1. PHYSICAL GEOLOGY (3:2:3) Earth processes and their effects on the materials, structure, and morphology of the earth's crust. Practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps.
- \*20. OUR EARTH (3:2:2) Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation.
- \*21. EARTH HISTORY (3:2:2) Evolution of the earth; changing patterns of mountains, lowlands, and seas; development of living organisms. Practicum includes field trips, studies of geologic maps, geologic problems, fossils.
30. PHYSICAL AND HISTORICAL GEOLOGY (3:2:3) Earth structure, processes, origin, and history. Practicum includes field trips, map work, and study of rocks, dynamic models, fossils.

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\*This course includes from one to several field trips for which an additional charge will be made to cover transportation.

## **HEALTH EDUCATION (HL ED)**

303. EMERGENCY CARE (2:1:2) Competencies leading to American Red Cross Advanced First Aid and Emergency Care and American Heart Association Cardiopulmonary Resuscitation certification.

## **HISTORY (HIST)**

19. MODERN EUROPE, 1815 TO THE PRESENT (3:3:0) Growth of European democracy; scientific progress; Italian and German unification; Industrial Revolution; imperialism; the world wars; search for security and stability; Fascism and Communism.
21. HISTORY OF THE UNITED STATES SINCE 1865 (3:3:0) Integrated survey emphasizing the emergence of a dominantly urban-industrial society; expanded role of government; America's increasing involvement in world affairs.
156. (L.S. 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.

## COURSE DESCRIPTIONS

### **HOTEL AND FOOD SERVICE (H F S)**

802. **SANITATION AND HOUSEKEEPING (3:3:0)** Practical applications of sanitation principles to food service and housing delivery systems; organization and work methods in the housekeeping function.
804. **HOTEL AND FOOD SERVICE MERCHANDISING (3:3:0)** Merchandising as a system distributing benefits, collecting costs, concerned with motivating consumers. Topics include: promotion, menu planning, and research methods.
805. **TRAINING AND SUPERVISION (3:3:0)** Methods and techniques of training and supervising food service and housing employees for overall efficiency of operation.
810. **FOODS EXPERIENCE (4:3:2)** Theory, observation, and practice in food services; emphasis on planning, preparation, and service in commercial food operations.
850. **FOOD SERVICE DELIVERY SYSTEMS (4)** Physical characteristics of principal food product groups considered. Topics include: purchasing problems, preparation techniques, quality and cost control. Prerequisites: Acctg. 101, F.S.H.A. 225.
860. **FOOD SERVICE SUPERVISION (4)** The principal food service administrative routines are considered from the point of view of the supervisor and middle manager. Prerequisite: H.F.S. 850.
870. **FOOD AND BEVERAGE ADMINISTRATION (4)** Components of food service systems are identified and studied as separate problems and as a total system. Prerequisite: H.F.S. 860.
875. **HOSPITAL FOOD OPERATING SYSTEMS (4)** Consideration of hospital food service system as determined by patient needs, physical plant, operating policies, cost constraints and quality standards. Prerequisite: H.F.S. 860.

### **HUMAN DEVELOPMENT (H DEV)**

100. **INTRODUCTION TO HUMAN DEVELOPMENT (1:1:0)** Human development as a process of man-environment transactions, and the relationships of various fields to the study of that process.
200. **EMPIRICAL INQUIRY IN HUMAN DEVELOPMENT (3:3:0)** Introduction to methods and philosophy of empirical inquiry applied to problems of human development.
321. **FIELD PROJECTS (1-12)** Independent study and research in a human service program; written and oral summary of rationale, procedures, findings.

### **HUMANITIES (HUMAN)**

1. **VALUES OF THE WESTERN CULTURAL HERITAGE (3:3:0)** Fundamental values of human experience as expressed in outstanding philosophical and literary works.
2. **SHAPING OF THE MODERN MIND (3:3:0)** Relevance to the present age of influential literary and philosophical texts illustrative of the principal epochs of Western civilization.
21. **IDEAS AND ARTS (3:3:0)** Interaction of intellectual and aesthetic values from the Renaissance to the present.
101. **MODERN SCIENCE AND HUMAN VALUES (3:3:0)** Relationships of science to the aspirations, values, and arts of man.
800. **SOURCES OF MORALITY (3:3:0)** The uses of law and love in man's endeavor to perfect himself.
801. **SCIENCE, TECHNOLOGY, AND HUMAN VALUES (3:3:0)** The effect of science and technology upon man's being, thought, and action.



## INDIVIDUAL AND FAMILY STUDIES (I F S)

16. **EFFECTIVE INTERPERSONAL SKILLS (1:1:0)** Training in interaction skills required for the development and maintenance of satisfying interpersonal relationships.
129. **INTRODUCTION TO INDIVIDUAL AND FAMILY DEVELOPMENT (3:3:0)** Introduction to psychosocial and family development at all stages of the individual and family life cycle.
319. **FAMILY FINANCIAL MANAGEMENT (3:3:0)** How families plan their finances and factors that determine their decisions.
329. **INFANCY AND EARLY CHILDHOOD (3:3:0)** Theories, research findings, and methods in social/behavioral/biological sciences related to developmental processes and intervention during infancy/early childhood. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.

## INDUSTRIAL ENGINEERING (I E)

315. **INDUSTRIAL ORGANIZATION AND ADMINISTRATION (3:3:0)** Fundamental principles of organization leading to intelligent appreciation of the simpler problems of factory organization and operation. Students registered in industrial engineering may not schedule this course.

## INDUSTRIAL ENGINEERING TECHNOLOGY (I E)

804. **NOMOGRAPHY (1:0:2)** The preparation of charts and monograms used in the analysis and presentation of engineering and production problems. Prerequisite: Math. 802.
805. **ECONOMICS OF INDUSTRY (2:2:0)** Internal economics of industrial enterprise, cost factors, and methods of comparing alternate proposals.
807. **STATISTICAL QUALITY CONTROL (3:3:0)** The application of this technique to the control of the manufacturing processes and to inspection. Prerequisite: Math. 802.
808. **PLANT LAYOUT (2:0:6)** Arrangement and layout of equipment and processes in an industrial plant for the most economical production. Prerequisites: E.G. 10, I.E. 816.
809. **INSPECTION AND QUALITY CONTROL (3:2:2)** Inspection methods and procedures and their application to control and acceptance sampling based on statistical methods. Prerequisite: E.G. 31.
810. **PRODUCTION LAYOUT AND CONTROL (3:1:6)** Arrangement of equipment and processes in industry and subsequent control of production through stores, routing, scheduling, dispatching, and follow-up techniques. Prerequisite: I.E. 816.
811. **MANUFACTURING MATERIALS AND PROCESSES (3:2:3)** Mechanical properties of materials; primary processing methods used in manufacturing, emphasizing ferrous metals, their relationship to other metals and nonmetals.
812. **MANUFACTURING PROCESSES (3:0:9)** Technology related to metal removal, dimensional inspection, metal joining, hot and cold forming heat treating, metal casting, properties of materials. Prerequisite: I.E. 811.
815. **PRODUCTION DESIGN (3:1:6)** The planning, designing, and specifying of both standard and special tools required for the production of manufactured goods. Prerequisites: E.G. 803, I.E. 812.
816. **METHODS ANALYSIS AND MOTION STUDY (3:1:6)** Construction and use of process charts, primary approach to operation analysis, and principles of motion economy. Prerequisite: I.E. 812.
817. **TIME STUDY AND WAGE PAYMENT (3:1:6)** Fundamentals of time study with instruction in time study practices; application of time studies to incentive wage payment systems. Prerequisite: I.E. 816.



## **COURSE DESCRIPTIONS**

818. **DIGITAL COMPUTER APPLICATIONS (3:2:2)** Application of the digital computer to industrial engineering problems. Prerequisite: Cmp.Sc. 101.
819. **NUMERICAL CONTROL (3:2:2)** Programming point-to-point and continuous path programs for computer-controlled manufacturing processes. Prerequisite: Cmp.Sc. 101.
830. **SELECTED TOPICS IN INDUSTRIAL ENGINEERING TECHNOLOGY (3)** Individual or group work in industrial engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## **INSURANCE (INS)**

800. **INSURANCE PRINCIPLES (3:3:0)** Introductory survey of all lines of insurance for handling business and personal risks.
810. **LIFE INSURANCE (3:3:0)** The life insurance contracts as methods of treating the problems of premature death and superannuation. Prerequisite: Ins. 800.
820. **PROPERTY AND CASUALTY INSURANCE (3:3:0)** Fundamental principles of property and casualty insurance. Prerequisite: Ins. 800.
830. **INSURANCE PRACTICUM (3:3:0)** Practical introduction to insurer operations in company and agency offices. Prerequisite: Ins. 820.

## **INTERNATIONAL BUSINESS (I B)**

862. **INTERNATIONAL BUSINESS (3:3:0)**

## **JOURNALISM (JOURN)**

200. **THE MASS MEDIA AND SOCIETY (3:3:0)** Mass communications in the United States; organization, role, content, and effects of newspapers, magazines, television, radio, books, and films. Students who are planning to enroll in, or who are currently enrolled in, the School of Journalism may not take this course.
800. **HISTORY AND SURVEY OF MASS COMMUNICATIONS (3:3:0)** History and role of mass media and advertising in society; nature of newspaper, magazine, broadcasting, book, and motion picture industries.
801. **BEGINNING NEWS WRITING (3:1:4)** Techniques of news writing with emphasis on organizing the story. Detailed critiques and class discussion of student writing. Prerequisites: Engl. 4, Journ. 800, ability to type.
802. **BEGINNING REPORTING (3:1:4)** The techniques of gathering news; problems of taste, ethics, and legality in reporting the news; community reporting assignments. Prerequisite: Journ. 801.
803. **FUNDAMENTALS OF EDITING (3:1:4)** Techniques of editing material for publication; printing processes; copyreading; headline writing; typography; picture editing; layout; legal and ethical considerations. Prerequisite: Journ. 802.
804. **REPORTING THE COMMUNITY (3:0:9)** Practicum in newspaper reporting, editing, and production. Prerequisite: Journ. 803.
811. **ADVERTISING COPYWRITING (3:1:4)** Techniques of writing advertising headlines and copy, with emphasis on spelling, grammar, and word choice. Detailed critiques of student writing. Prerequisite: Journ. 800.
812. **ADVERTISING LAYOUT (3:1:4)** Print advertisement design and production, including typography, plate making, mat services, shop procedures, etc.; detailed critiques of layouts; field trips. Prerequisite: Journ. 800.

813. ADVERTISING MEDIA AND CAMPAIGNS (3:1:4) Media selection and coordination, creative strategy, and campaign execution. Each student plans and produces a complete advertising campaign. Prerequisites: Journ. 811, 812.

814. NEWSPAPER ADVERTISING (3:0:9) Management of the newspaper advertising department, advertising sales promotion, preparing the sales presentation, dealing with the advertiser, advertising page make-up. Prerequisite: Journ. 813.

820. NEWSPAPER MANAGEMENT (3:3:0) Managing and publishing newspapers in the United States; problems of law, finance, personnel, promotion, technological change, and community service. Prerequisite: Journ. 803 or 813.

## LABOR STUDIES (L S)

100. INDUSTRIAL RELATIONS (3:3:0) Introductory analysis of the employment relationship and of the interrelated interests of managements, workers, unions, and the public.

102. STRUCTURE AND FUNCTION OF UNIONS (3:3:0) A study of the internal structure, goals, and impact on society of unions.

103. LABOR LEGISLATION (3:3:0) A study of legislation regulating the functioning of trade unions.

104. THE PRACTICE OF COLLECTIVE BARGAINING (3:3:0) A study of the process of collective bargaining, the issues in collective bargaining, and bargaining relationships.

156. (Hist. 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.

189. LABOR STUDIES PROBLEMS (3:3:0) Individual study of special problems in labor studies. Prerequisite: three courses in labor studies.

## LAW ENFORCEMENT AND CORRECTIONS (L E C)

111. POLICE AND THE COURTS (3:3:0) Examines evolution, organization, operation of law enforcement agencies; justice process through conviction, law enforcement interface with other justice system elements.

221. CORRECTIONAL STRATEGIES (3:3:0) Examination of the criminal justice system from sentencing through final discharge from correctional supervision, and relationship to pre-conviction system. Prerequisite: L.E.C. 111.

240. RESEARCH STRATEGIES IN ADMINISTRATION OF JUSTICE (3:3:0) A survey of the various research strategies relevant to the investigation of research questions in the administration of justice. Prerequisites: H.Dev. 200; Ed.Psy. 300 or Psy. 15 or Stat. 200.

321. INITIAL FIELD PROJECT IN ADMINISTRATION OF JUSTICE (8:0:16) Initial placement to be taken prior to seventh-term standing; may be placed in any type administration of justice agency. Prerequisites: Com.D. 7, L.E.C. 111, 221.

## MANAGEMENT (MGMT)

800. PRINCIPLES OF MANAGEMENT (3:3:0)

801. PRINCIPLES OF MANAGEMENT (3:3:0) Prerequisite: Mgmt. 800.

802. SUPERVISORY MANAGEMENT (3:3:0) Preparation for supervisory positions in formal organizations. Emphasis placed on the motivational aspects of the supervisor's job. Prerequisite: Mgmt. 800.

## **COURSE DESCRIPTIONS**

### **MAN-ENVIRONMENT RELATIONS (M E R)**

213. PRINCIPLES OF CLOTHING I (2:2:0) Analysis of aesthetic, functional, and socio-psychological factors related to clothing needs and usage.

214. PRINCIPLES OF CLOTHING II (2:2:0) Current cultural influences on the designer, design media, and construction processes in the mass production technology of clothing. Prerequisite: M.E.R. 213.

215. CLOTHING CONSTRUCTION (1-4) Experimentation with construction techniques for selected fabrics and design requirements. Prerequisite or concurrent: M.E.R. 213, or consent of instructor.

301. ELEMENTARY TEXTILES (3:2:2) Recognition, use, and care of textiles related to characteristics of fibers, yarns, fabric construction, and finishes. Prerequisite: Chem. 11 or Ph.Sc. 8.

### **MARKETING (MKTG)**

800. PRINCIPLES OF MARKETING (3:3:0)

801. PRINCIPLES OF MARKETING (3:3:0) Prerequisite: Mktg. 800.

802. PROMOTION MANAGEMENT (3:3:0) The application and management of various forms of persuasive communication with potential customers: personal selling, sales management, advertising, sales promotion. Prerequisite: Mktg. 801.

804. PRINCIPLES OF RETAILING SALESMANSHIP (3:3:0) Principles of selling applied to the retail level of trade; practical application of these principles in various sales situations.

805. RETAILING I (3:3:0) An analysis of the management and merchandising policies of various types of retailing institutions.

806. RETAILING II (3:3:0) Merchandising, promotion, and control policies of retail store management. Prerequisite: Mktg. 805.

### **MATERIALS TECHNOLOGY (MAT T)**

800. INTRODUCTION TO MATERIALS TECHNOLOGY (4:3:2) Introduction to the nature of inorganic materials, types of manufacturing processes involved, and general characteristics of the products.

801. CHEMISTRY OF MATERIALS (4:3:2) Chemistry of the preparation and blending of raw materials; forming and firing operations and subsequent treatments of the material.

802. PHYSICS OF MATERIALS (4:3:2) Physical changes occurring during firing processes and in subsequent treatment of the materials.

803. MATERIALS TESTING (4:2:4) Applications of testing procedures to determine properties of inorganic materials.

804. SUMMER FIELD PRACTICE (4) Practical experience in the material industries; plant experience with equipment utilized in processing, manufacturing, and testing of inorganic materials.

### **MATHEMATICS (MATH)**

4. INTERMEDIATE ALGEBRA (3:2:2) Polynomials, fractions, exponents, radicals, first and second degree equations and inequalities, relations and functions, systems of equations. Limited to students scoring remedially on the preregistration test. Prerequisite: ½ unit of algebra.



5. COLLEGE ALGEBRA (3:2:2) Relations and functions; roots of polynomials and complex numbers; sequences, mathematical induction; binomial theorem; matrices, determinants; analytic geometry. Prerequisite: 1 unit of algebra or Math. 4.
10. PRECALCULUS MATHEMATICS (3:3:0) Polynomial expressions; simultaneous equations; exponents, logarithms, binomial theorem; polynomial roots; trigonometric functions; right triangles; identities; lines and conic sections. Limited to those students scoring remedially on the preregistration test. Prerequisites: 1 unit of algebra,  $\frac{1}{2}$  unit of trigonometry.
17. FINITE MATHEMATICS (3:3:0) Introduction to logic, sets, probability.
18. ELEMENTARY LINEAR ALGEBRA (3:3:0) Matrices and vectors; transformations; systems of linear equations; convex sets and linear programming. Prerequisite: 3 units of high school mathematics.
- 35-36. GENERAL VIEW OF MATHEMATICS (3:3:0 each) Discussions revealing past and recent mathematical innovations as extensions of creative thinking within the human endeavor. For the nonmathematically inclined. Prerequisite: seventh-term standing.
800. BUSINESS MATHEMATICS (3:3:0) Review of arithmetic, decimals, fractions, percentages, interest, and discounts; introduction to algebraic techniques; applications to business computations.
- 801-802. TECHNICAL MATHEMATICS (3:3:0 each) Elements of algebra and trigonometry for students in two-year technical programs. Prerequisites: 1 unit in algebra, 1 unit in plane geometry.
803. TECHNICAL CALCULUS (3:3:0) Selected introductory topics from analytic geometry, differential calculus, integral calculus. Prerequisites: Math. 801, 802.

## MECHANICAL ENGINEERING TECHNOLOGY (M E)

800. MECHANISMS (2:0:4) Motion in machine elements; strength and properties of materials; design of machine elements. Prerequisite: E.Mch. 811.
805. KINEMATICS (3:2:3) Graphical and analytical studies of relative motions, instant centers, velocity and acceleration in plane motions, slider crank mechanisms, cams, gears, gear trains, and flexible connectors. Prerequisites: E.G. 1, E.Mch. 811.
807. HEAT TRANSFER (3:3:0) Basic principles of conduction, convection, and radiation, emphasizing practical applications.
810. PRODUCT DESIGN (3:1:6) Design of machine elements including levers, bearings, shafts, clutches, springs, and gears; selection of ball bearings and belts; design of small mechanical devices. Prerequisites: E.Mch. 813, M.E. 805.
830. SELECTED TOPICS IN MECHANICAL ENGINEERING TECHNOLOGY (3) Individual or group work in mechanical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.
880. AIR POLLUTION ANALYSIS INSTRUMENTATION (8) Principles and applications of instruments for measuring particle and gaseous pollutants; theory, installation, operation, maintenance, and related instrumentation. Prerequisite: Math. 803 or one course in college mathematics.
881. ELEMENTARY THERMO AND FLUID DYNAMICS (2:2:0) Basic problems in compressible fluid flow. Laws of dynamics and thermodynamics, mechanical properties of fluids, elementary heat transfer. Prerequisites: Math. 803, Phys. 150.
882. AIR RESOURCE MANAGEMENT (2:2:0) Introduction to air pollution. Pollutants, sources, effects, air monitoring systems, air quality criteria and standards, governmental control programs and procedures.
883. AIR POLLUTION ANALYSIS INSTRUMENTATION (3:2:x) Fundamentals of chemistry, electronics, fluid flow, and small particle technology as applied to air pollution instrumentation. Prerequisites: Chem. 13, Phys. 150.
884. SAMPLING AND MONITORING PROGRAM (2:0:4) Instrumentation and site selection, field data acquisition for major air pollutants, data analysis and evaluation.



## COURSE DESCRIPTIONS

### METALLURGY (METAL)

800. METALLURGICAL LABORATORY PRACTICE (4:2:4) Instruction and practice in various metallurgical techniques. Prerequisites: E.G. 10, Math. 802. Prerequisite or concurrent: Phys. 150.
801. FERROUS METALLURGY (3:2:2) Making, shaping, and heat treatment of cast irons and steels. Prerequisites: Chem. 12, Metal. 800.
802. PHYSICAL METALLURGY (3:2:2) Structures of metals and alloys; structure manipulations; structure-property relationships. Prerequisites: Phys. 150, Math. 802, Metal. 800.
803. NONFERROUS METALLURGY (3:2:2) Reduction of nonferrous metals from their ores and subsequent compositional adjustment by refining and alloying. Prerequisites: Chem. 12, Metal. 800.
804. PLANT TRIPS (1:0:3) Plant visits to study industrial ferrous and nonferrous metallurgical operations. Spring term, odd years.
805. METALLURGICAL OPERATIONS (1:0:2) Classroom discussion by local metallurgists pertaining to their work and the role of the metallurgical associate in their operations. Spring term, even years.

### METEOROLOGY (METEO)

303. INTRODUCTORY METEOROLOGY (3:2:2) Nontechnical treatment of fundamentals of modern meteorology; effect of weather and climate on man and his activities. A student who took Meteo. 300 or 304 may take this course for 1 credit only.

### MICROBIOLOGY (MICRB)

1. INTRODUCTORY MICROBIOLOGY (2:2:0) Elementary principles of bacterial morphology and physiology; relation of microorganisms to fermentation, disease, food, dairy products, water purification, sewage disposal, and soil fertility. Prerequisite: Chem. 12.
2. INTRODUCTORY MICROBIOLOGY LABORATORY (2:0:4) Qualitative and quantitative techniques with regard to recognition of bacteria and their processes on a microscopic, colonial, and physiological basis. Prerequisite or concurrent: Micrb. 1. Prerequisite: Chem. 12.
6. ELEMENTARY MICROBIOLOGY (2:2:0) Importance of microorganisms in public health and disease, agriculture and industry; descriptive course for nontechnical students.
7. ELEMENTARY MICROBIOLOGY LABORATORY (1:0:2) Selected techniques with regard to recognition and enumeration of bacteria; effects of chemical and physical agents on microorganisms. Prerequisite or concurrent: Micrb. 6.
101. MEDICAL MICROBIOLOGY FOR MEDICAL LABORATORY TECHNICIANS (5:3:4) Procedures and techniques used to isolate and diagnose clinically significant organisms such as bacteria, fungi, and other human parasites. Prerequisites: Micrb. 1, 2.
102. HEMATOLOGY FOR MEDICAL LABORATORY TECHNICIANS (5:3:4) Theoretical and practical aspects of hematological diagnostic studies related to erythrocyte and leukocyte disorders in man.
801. CLINICAL LABORATORY ORIENTATION FOR MEDICAL LABORATORY TECHNICIANS (6:3:6) Introduction to basic principles of clinical laboratory work, including the collection, handling, and preparation of biological samples.

## MINERAL ENGINEERING (MIN E)

61. (Metal. 61) INTRODUCTION TO COAL PREPARATION (3:3:0) Theory and application of modern coal preparation practice. Sampling, crushing, sizing, gravity concentration, flotation, dewatering, drying; pollution control; flowsheets.

## MINING (MNG)

23. MINERAL LAND AND MINE SURVEYING (3:0:9) Surveying theory and practice applied to mineral lands and mines; traversing, leveling, mapping, shaft plumbing; stope, room, and development surveying. Prerequisite: E.G. 11.

30. INTRODUCTION TO MINING ENGINEERING (3:2:3) Examination, development, and exploitation of mineral deposits in case studies of mineral deposits and mines; unit operations, cycling, equipment, methods.

## MINING TECHNOLOGY (MNG T)

800. MINING TECHNOLOGY ORIENTATION (1:0:2) Films, slides, and lectures to acquaint the student with the coal mining industry and its impact on society.

801. COAL MINING TECHNOLOGY (3:2:3) Analysis of coal mining systems; integration of unit operations and mining methods for efficient mine production. Prerequisite: Mng.T. 800.

802. MINE VENTILATION (3:2:3) Quality and quantity analysis and control of mine atmosphere. Prerequisite or concurrent: Chem. 11, Phys. 150.

803. STRATA CONTROL (3:2:3) Fundamentals of stresses and strains in rocks; virgin and concentrated stresses; roof support, subsidence, bursts, and stability control. Prerequisite or concurrent: Mng.T. 801.

804. MINE PLANT TECHNOLOGY (3:2:3) Electrical systems in mines; mechanical power applications and materials handling systems. Prerequisite: Phys. 150.

805. MINE SYSTEMS TECHNOLOGY (3:2:3) Quantitative methods of work measurement and their application to production and method study problems related to mines. Prerequisite: Mng.T. 801.

806. MINE MANAGEMENT AND LAW (3:3:0) The problems of the individual in coal mine management in relation to environment, employer, union, and law. Prerequisite: Econ. 14.

807. ELECTRICAL MINE MACHINE CIRCUITS (3:2:3) Topics of electrical power fundamentals, power and control circuits, and motors and their mine applications will be covered. Prerequisite: Mng.T. 804.

808. MINE POWER DISTRIBUTION (3:2:3) Topics of high voltage circuits, underground transmission, power stations, power conversion, safety regulations and power devices will be covered. Prerequisite: Mng.T. 804.

809. MINE MACHINERY HYDRAULICS (3:2:3) Topics of basic hydraulic principles and their application to mining and mine machinery will be covered. Prerequisites: Math. 802, Phys. 150.

810. MINE MACHINE DYNAMICS (3:2:3) Topics on basic machines and their application to the principles of mine machine operation will be covered. Prerequisites: E.Mch. 811, Phys. 150.

811. PRACTICUM IN MINE MAINTENANCE (3:0:9) Field and shop techniques in procedures of electrical, mechanical and hydraulic phases of mine maintenance will be covered. Prerequisites: Mng.T. 804, Phys. 150.

## **COURSE DESCRIPTIONS**

### **MUSIC (MUSIC)**

5. THE FUNDAMENTALS OF MUSIC APPRECIATION (3:3:0) Recitation and lectures with recorded examples of melody, harmony, rhythm, vocal and instrumental timbre, form, and program and absolute music.

### **MUSIC EDUCATION (MU ED)**

806. MUSIC SKILLS FOR RECREATION LEADERS (3:3:0) Theories and practice in music activities found in group and club settings. Appreciation, leadership techniques, and fundamental musicology.

### **NUCLEAR ENGINEERING TECHNOLOGY (NUC E)**

800. NUCLEAR AND ATOMIC SCIENCE (2:2:0) Introduction to the theories of atomic and nuclear structure and electromagnetic radiation. Prerequisites: Phys. 151, Math. 803.

801. RADIOLOGICAL SAFETY (2:2:0) Discussion of basic radiation dose units, radiation monitoring techniques, biological effects of radiation, and AEC regulations. Prerequisite or concurrent: Nuc.E. 800.

802. ELEMENTS OF NUCLEAR TECHNOLOGY (2:2:0) Study of nuclear radiations, nuclear interactions, neutron diffusion, and reactor materials. Prerequisite: Nuc.E. 800.

803. ELEMENTS OF NUCLEAR POWER GENERATION (3:3:0) Survey of various reactor types with emphasis on fuel heat removal and power generation, shielding, fuel fabrication and reprocessing. Prerequisite: Nuc.E. 802.

804. INTRODUCTION TO REACTOR TECHNOLOGY (3:3:0) Steady state reactor theory, kinetic behavior of reactors and reactor control systems. Prerequisite: Nuc.E. 802.

805. PRINCIPLES OF MEASUREMENT (3:2:2) A study of measurement in the nuclear industry, including the instruments used, accuracy of measurement, and statistical justification. Prerequisites: E.E. 814, Phys. 151.

812. NUCLEAR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of radiation measurements and the diversified application of nuclear techniques. Prerequisites: Nuc.E. 801, 802.

814. REACTOR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of basic reactor experiments, control rod calibration, critical experiment, etc. Emphasis placed upon reactor operations. Must be taken with Nuc.E. 804. Prerequisite: Nuc.E. 801.

830. SELECTED TOPICS IN NUCLEAR ENGINEERING TECHNOLOGY (3) Individual or group work in nuclear engineering technology for students with specific occupational objectives. Prerequisite: fourth-term standing.

### **NURSING (NURS)**

800. FOUNDATIONS OF TECHNICAL NURSING I (6:4:8) Role of the nurse in society and the health care team; nursing techniques used to meet basic patient needs.

801. FOUNDATIONS OF TECHNICAL NURSING II (6:4:8) Nursing techniques utilized to meet the needs of the patient undergoing diagnosis or basic medical or surgical treatment. Prerequisites or concurrent: Biol. 29, 41, Micrb. 6, Nurs. 800.

802. TECHNIQUES OF NURSING IN CHILDHOOD (7:3:16) Application of nursing techniques to the health needs of persons in the 2-week-old to 19-year-old age group. Prerequisite: Nurs. 801.



803. **TECHNIQUES OF NURSING THE MATURE PATIENT (7:3:16)** Application of nursing techniques to the health needs of persons in the 20-year-old to 40-year-old age group. Prerequisite: Nurs. 801.
804. **TECHNIQUES OF NURSING THE PATIENT IN THE MIDDLE YEARS (7:3:16)** Utilization of nursing techniques to meet the health needs of persons in the 41-year-old to 65-year-old age group. Prerequisite: Nurs. 801.
805. **TECHNIQUES OF NURSING THE PATIENT IN SENESCENCE (7:3:16)** Application of nursing techniques to meet the health needs of persons over 65 years of age. Prerequisite: Nurs. 801.
806. **NURSING SEMINAR (3:3:0)** Current issues in nursing, and adjustments of the student to the role of the graduate technical nurse. Prerequisite or concurrent: Nurs. 801.

## NUTRITION (NUTR)

150. **ELEMENTARY NUTRITION (2:2:0)** Fundamentals of nutrition and its relation to human health. Students who have passed Nutr. 351 may not schedule this course.
351. **INTRODUCTORY PRINCIPLES OF NUTRITION (3:3:0)** The nutrients: food sources and physiological functions as related to human growth and well-being throughout life; current nutrition issues. Students who have passed Nutr. 150 may not schedule this course.
800. **NORMAL DIET MODIFICATIONS (4:3:3)** Modifications of normal diet to meet therapeutic needs in patient care and rehabilitation.

## PHILOSOPHY (PHIL)

1. **INTRODUCTION TO LOGIC (3:3:0)** Principles of correct thinking; deductive and inductive inference; use and misuse of language in reasoning.
2. **INTRODUCTION TO PHILOSOPHY (3:3:0)** Evaluation of the intellectual and moral tone of the present day through a study of existentialism and other recent philosophies. Prerequisite: fourth-term standing.
4. **BASIC PROBLEMS OF PHILOSOPHY (3:3:0)** How important philosophers have treated the perennial problems of knowledge, reality, free will, etc.
12. **ELEMENTS OF SYMBOLIC LOGIC (3:3:0)** How to translate arguments into symbolic language and test them for validity using truth-tables and deduction rules. For nonscience majors.
212. **SYMBOLIC LOGIC (3:3:0)** The logic of classes, propositions, relations, and quantification; the nature and properties of formal systems. Intended primarily for science-oriented students. Prerequisite: fourth-term standing.

## PHYSICAL EDUCATION (PH ED)

- \*5. **PHYSICAL EDUCATION (1:0:3 per term)** Activities to develop physical and recreational skills; beginning swimming required of those who fail swim-safety test. Selection from archery, badminton, bowling, canoeing, casting, dancing, fencing, field hockey, figure skating, golf, gymnastics, handball, hunter safety, personal defense, riflery, sailing, scuba, soccer, squash, swimming, tennis, volleyball, weight training, and others. Typically, two activities per term.
801. **LIFETIME SPORTS (1:0:3)** Basic understanding of the fundamentals of lifetime sports and the leadership and supervision of such sports.

---

\*Must be repeated for a total of 3 credits to satisfy University Baccalaureate Degree Requirements.



## **COURSE DESCRIPTIONS**

802. SWIMMING (1:0:3) Fundamentals of swimming and the supervision of aquatic facility programs.
803. GAMES FOR CHILDREN (1:0:3) Low organized and lead-up games with emphasis on age group differences.
804. DANCE AND GYMNASTICS (1:0:3) Understanding dance forms and rudiments of gymnastics.
805. TEAM SPORTS (1:0:3) Basic understanding of the fundamentals of team sports, and the leadership and supervision of such sports.
806. OFFICIATING (1:0:3) Theory and practice of officiating games and sports.
807. ADAPTED ACTIVITIES (1:0:3) Adaptation of activities and methods of presentation of games for the handicapped.

## **PHYSICAL SCIENCE (PH SC)**

7. PHYSICAL SCIENCE (3:3:0) Development of physics, including modern physical concepts and their relationship to the careers of physical scientists. May not be scheduled by students who have received credit for Phys. 201 or 215.
8. PHYSICAL SCIENCE (3:3:0) Selected concepts of chemistry showing their development, interrelationship, and present status. May not be scheduled by students who have received credit for Chem. 11 or 12.

## **PHYSICS (PHYS)**

150. TECHNICAL PHYSICS (3:2:2) Elementary treatment of topics in mechanics, heat, wave motion, and sound leading toward an understanding of technical applications. Prerequisite: 1½ units of algebra. Prerequisite or concurrent: Math. 801.
151. TECHNICAL PHYSICS (3:2:2) Elementary treatment of topics in electricity, light, and modern physics leading toward an understanding of technical applications. Prerequisite: Phys. 150.
215. INTRODUCTORY PHYSICS (4:3:2) Selected topics in mechanics, heat, and sound. Prerequisite: algebra to quadratics.
265. INTRODUCTORY PHYSICS (4:3:2) Selected topics in light, electricity, and magnetism. Prerequisite or concurrent: Phys. 215.

## **PLANT SCIENCE (PLTSC)**

800. FIELD AND FORAGE CROP PRODUCTION (3:2:2) Production of field crops and pastures; management practices in relation to crop species; soil adaptation for desired yield and use.
801. PRODUCTION OF HORTICULTURAL CROPS (3:2:2) The application of scientific principles to horticultural crop production.
802. USE OF AGRICULTURAL CHEMICALS (3:2:2) Principles and practices relating to safe and effective control of weeds, insects, and plant diseases through use of chemical toxicants.

## **POLITICAL SCIENCE (PL SC)**

1. AMERICAN NATIONAL GOVERNMENT (3:3:0) Development and nature of American political culture; constitutional and structural arrangements; policy-making processes; sources of conflict and consensus.

## PSYCHOLOGY (PSY)

2. **PSYCHOLOGY (3:3:0)** Introduction to general psychology; principles of human behavior and their applications.

13. **INTRODUCTION TO DEVELOPMENTAL PSYCHOLOGY (3:3:0)** Developmental principles; physical growth; linguistic, intellectual, emotional, and social development from infancy to maturity. Prerequisite: Psy. 2.

37. **MENTAL HEALTH (3:3:0)** Maintaining adjustment, developing a well-balanced personality; behavior disorders and their treatment. May not be used as prerequisite for any course in psychology. Not open to psychology majors or those who have credit for Psy. 437.

## QUANTITATIVE BUSINESS ANALYSIS (Q B A)

101. **ELEMENTARY BUSINESS STATISTICS (3:3:0)** Introduction to methods of collection, presentation, and analysis of economic and business data.

102. **ELEMENTARY BUSINESS STATISTICS (3:3:0)** Methods of isolating trend, seasonal and cyclical, simple linear and multiple correlation, analysis of variance, applications of statistical techniques to economic and business problems. Prerequisite: Q.B.A. 101.

801. **ELEMENTARY BUSINESS STATISTICS (3:3:0)** Collection, tabulation, measurement, presentation, and interpretation of quantitative material. Prerequisite: fourth-term standing.

## REAL ESTATE (R EST)

800. **REAL ESTATE PRINCIPLES (3:3:0)** Nature of the real estate market; introduction to the functions performed in the real estate business.

810. **REAL ESTATE SALES (3:3:0)** Principles underlying the sale of real estate; the use of selling tools and procedures in the analysis of customers' needs.

830. **REAL ESTATE FINANCE (3:3:0)** Basic principles of real estate finance; sources of funds for financing real estate.

## RECREATION AND PARKS (RC PK)

120. **MAN AND LEISURE (3:3:0)** Introduction to leisure in historical and contemporary perspective. Relationships between leisure and other social institutions. Determinants of leisure behavior.

130. **OUTDOOR LIVING SKILLS (1:0:3)** Direct experience with outdoor living skills and backpacking; weekend campout. American Camping Association's Advanced Campcraft certification skills covered. Prerequisite: American Red Cross Standard First Aid and Personal Care certificate recommended.

150. **THE SCOPE OF RECREATION AND PARKS SERVICES (1)** Observation of and exposure to components, programs, and agencies which make up the field of recreation and parks services.

190. **THE ROLE OF THE RECREATION AND PARKS PROFESSIONAL (1:1:0)** Orientation to role of recreation and parks professionals in providing leisure services in various settings and through diverse agencies. Prerequisite: Rc.Pk. 120.

230. **CAMP COUNSELING (2:1:2)** Counselor skills and responsibilities for the organized camp.

236. **THEORY AND PRACTICE OF RECREATION LEADERSHIP (3:2:2)** Methods and materials; experience in recreation leadership with different age groups and in a variety of school and community settings.

## **COURSE DESCRIPTIONS**

850. **FIELD PRACTICUM (3)** Observation and participation in a recreation system, hospital, youth-serving agency, or other setting.

856. **RECREATION PROGRAM PLANNING (3:3:0)** The theory and exploration of program planning in the various recreation settings. Policies and philosophies pertinent to the program areas.

875. **INTRODUCTION TO THERAPEUTIC RECREATION (3:3:0)** Recreation for the mentally retarded, physically handicapped, emotionally disturbed, the aged, and the culturally different in institutions and community settings.

877. **THERAPEUTIC RECREATION PROGRAM (3:3:0)** Critical examination of therapeutic recreation leader's role in relation to other human services, activity analysis and counseling techniques. Prerequisite: Rc.Pk. 875.

## **RETAILING (RTL)**

833. **SELECTION AND USE OF TEXTILES (3:2:4)** Selection, use, and care of textile products as affected by fiber, yarn, and fabric construction, and finishing processes.

834. **FORCES OPERATING IN THE CLOTHING AND TEXTILE INDUSTRY (2:2:0)** Description of ways in which operations of the various segments of the clothing and textiles industry impinge on retailing. Prerequisites: Mktg. 804, 805, 806.

840. **MANAGEMENT IN THE HOME (3:3:0)** The principles of decision making, work simplification, use of equipment, and home safety applied to family management.

850. **DISPLAY TECHNIQUES (2:1:3)** Display as visual communication, emphasizing the techniques related to merchandising and art. Prerequisite: an art or art appreciation course.

## **SOCIAL SCIENCE (SO SC)**

1. **THE URBANIZATION OF MAN: A SOCIAL SCIENCE PERSPECTIVE (3:3:0)** An overview of the social sciences, including an interdisciplinary analysis of the urban process.

2. **CONTEMPORARY MAN AND SOCIETY (3:3:0)** Selected contemporary issues in the perspective of history, sociology, psychology, economics, and political science.

## **SOCIAL STUDIES (SO ST)**

800. **HUMAN CULTURES AND THE INDIVIDUAL (3:3:0)** Basic components of human cultures, with emphasis upon specific elements of American culture.

801. **CRITICAL AND VISIONARY CONCEPTS OF SOCIETY (3:3:0)** Critical and visionary concepts of society from the Renaissance to the present, including major theorists, commentators, and imaginative writers.

## **SOCIOLOGY (SOC)**

1. **INTRODUCTORY SOCIOLOGY (3:3:0)** Social structure; basic human institutions; analysis of social processes; major social forces.

3. **INTRODUCTORY SOCIAL PSYCHOLOGY (3:3:0)** Culture, conduct, and the sociogenesis of behavior.

5. **SOCIAL PROBLEMS (3:3:0)** Poverty, delinquency, crime; family discord; industrial, race, and nationality conflicts; mental disorders.

7. **METHODOLOGY OF SOCIOLOGY (3:3:0)** Introduction to the nature, collection, and interpretation of materials used by social scientists in research and publication.



## **SPEECH COMMUNICATION (SPCOM)**

200. **EFFECTIVE SPEECH (3:3:0)** Introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.

*Unit A.* Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation.

*Unit B.* Principles of communication, implemented through group problem solving, with some attention to formal speaking and message evaluation.

*Unit C.* Principles of communication, implemented through analysis and evaluation of messages, with some attention to formal speaking and group discussion.

280. **ORAL INTERPRETATION (3:3:0)** Principles of oral interpretation of the printed page with practice in oral reading of poetry, prose, and drama.

330. **STUDIO PRACTICUM (1-3)** Supervised experience in the arts and crafts of radio and television production. Prerequisite: Sp.Com. 325 or 340.

801. **SURVEY OF BROADCASTING (3:3:0)** Introduction to broadcasting: history, organization, responsibilities, laws, rules and regulations.

802. **RADIO AND TELEVISION ANNOUNCING (3:1:4)** The study and application of oral communication techniques for radio and television announcing, including basic operation of related equipment.

803. **BASIC WRITING FOR RADIO AND TELEVISION (3:1:4)** Techniques of writing for radio and television stations, emphasizing copy and news writing. Prerequisite: Engl. 10.

804. **RADIO PROGRAMMING, PRODUCTION, AND PERFORMANCE (3:1:4)** Introduction to basic elements of radio programming and production, including developing, producing, and performing in radio announcements and programs. Prerequisites: Sp.Com. 801, 802, 803.

805. **TELEVISION PROGRAMMING, PRODUCTION, AND PERFORMANCE (3:1:4)** Introduction to basic elements of television programming and production, including developing, producing, and performing in television announcements and programs. Prerequisite: Sp.Com. 804.

830. **DIRECTED STUDIES (1-3)** Individual or group work in broadcast studies and/or projects for second-year students with specific occupational objectives. Prerequisite: Sp.Com. 805 and sixth-term standing.

## **STATISTICS (STAT)**

200. **ELEMENTARY STATISTICS (4:3:2)** Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. Prerequisite: 2 units in algebra.

## **THEATRE ARTS (THEA)**

104. **PROCESSES OF THEATRE PRODUCTION (3:1:4)** The procedures of design, coordination, and execution of scenery, costumes, lighting, and sound for nonprofessional productions.

109. **THE DRAMATIC ARTS IN THE MASS MEDIA (3:3:0)** The place of television-radio-film drama in our culture; relationship with other art forms; standards of evaluation.

806. **INTRODUCTION TO CREATIVE DRAMATICS (3:1:4)** Introduction and direct experience in creative dramatics and survey of children's theatre.



## COURSE DESCRIPTIONS

### WILDLIFE (WILDL)

801. INTRODUCTION TO WILDLIFE MANAGEMENT (3:3:0) Basic principles of wildlife management. Introduction to general ecology and wildlife population dynamics.
803. ANIMAL IDENTIFICATION (3:2:3) Identification of mammals, birds, reptiles, amphibians and fishes; introduction to their life histories.
804. WILDLIFE MENSURATION (3:2:3) The measurement of animal populations and vegetation samples.
805. FIELD AND LABORATORY TECHNIQUES (3:1:6) Techniques utilized in wildlife research and management; introduction to mapping, photography, census, record keeping and measurement of population structure. Prerequisites: For. 802, Wildl. 801, 803, 804, 812, 814. Concurrent: Wildl. 806.
806. OPERATIONAL PROCEDURES AND EQUIPMENT (2:1:3) Summer camp for operational procedures and the operation and maintenance of wildlife equipment and facilities. Concurrent: Wildl. 805.
807. OUTDOOR RECREATION (3:2:3) Sociology, history, and economics of recreational demand; recreational areas and management procedures.
809. ANIMAL CARE (3:2:3) Care and handling of captive wild animals.
811. AERIAL PHOTO INTERPRETATION (4:2:6) Techniques of photo interpretation; type mapping of wildlife environments; photo censusing of wild animals.
812. WILDLIFE FIELD SURVEYS (3:2:3) Terrestrial measurement, methods of plotting, area determinations, cover, and type mapping.
813. FISHERIES MANAGEMENT FOR TECHNICIANS (3:2:3) Introduction to fisheries management, biology of fishes, aquatic ecology, use and care of equipment, habitat surveys, and management practices.
814. HABITAT MANAGEMENT (3:0:9) Identification, ecological characteristics, manipulation of food and cover plants. Animal needs, range and habitat analysis, and management for wildlife.

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THE PENNSYLVANIA STATE UNIVERSITY  
UNIVERSITY PARK, PA 16802

STATE COLLEGE, PA  
16801

1979-1980

# The Pennsylvania State University Bulletin

## Associate Degree Programs

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**1979-1980**

# **THE PENNSYLVANIA STATE UNIVERSITY BULLETIN**

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## **ASSOCIATE DEGREE PROGRAMS**

### **REGULATIONS SUBJECT TO CHANGE**

The educational process necessitates change. This bulletin must be considered as informational and not binding on the University.

Each step of the educational process, from admission through graduation, requires continuing review and appropriate approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.



MAJORS AND CAMPUS LOCATIONS

BACCALAUREATE DEGREE MAJORS

The first two years of nearly all baccalaureate majors are offered at all campuses. Exceptions are baccalaureate majors in Architecture and Landscape Architecture, to which students are admitted only at the University Park Campus.

BACCALAUREATE DEGREE MAJORS																						
First two years of nearly all baccalaureate majors are offered at all campuses. Exceptions are baccalaureate majors in Architecture and Landscape Architecture, to which students are admitted only at the University Park Campus.																						
	LOCATIONS	ALLENTOWN	ALTOONA	BEAVER	†BEHREND COLLEGE	BERKS	DELAWARE COUNTY	DuBOIS	FAYETTE	HAZLETON	HERSHEY MEDICAL CENTER	McKEESPORT	MONT ALTO	NEW KENSINGTON	OGONTZ	SCHUYLKILL	SHENANGO VALLEY	**UNIVERSITY PARK	WILKES-BARRE	WORTHINGTON	SCRANTON	YORK
ASSOCIATE DEGREE MAJORS																						
Agricultural Business (1st yr. only)			•	•	•	•	•	•	•	•		•		•	•	•	•		•	•	•	•
Agricultural Business (2nd yr. only)																		•				
→ Air Pollution Control Engr. Tech. (1st yr.)			•	•	•		•	•	•	•			•		•	•	•			•	•	•
Air Pollution Control Engr. Tech. (1st & 2nd yr.)						•																
Architectural Engineering Technology									•								•				•	
Biomedical Equipment Tech. (1st yr.)			•	•	•	•	•	•	•	•						•	•				•	•
Biomedical Equipment Tech. (1st & 2nd yr.)														•					•			
Business Administration				•	•	•	•	•	•	•				•			•	•			•	
Chemical Engineering Technology						•																
Clinical Health Services											•											
Community Services* (Administration of Justice)						•	•															
Computer Science				•										•		•					•	•
Electrical Engineering Technology			•	•	•	•	•	•	•	•		•		•	•	•	•			•	•	•
Forest Technology													•									
Highway Engineering Technology																				•		
Hotel and Food Service						•																
Labor Studies*						•	•													•		
Letters, Arts, and Sciences*			•	•	•	•	•	•	•	•		•	•	•		•	•		•	•	•	•
Mass Communications — Broadcasting																				•		
Mass Communications — Journalism							•										•					
Mechanical Engineering Technology (Drafting and Design Technology)			•	•	•	•		•	•	•		•		•	•		•			•	•	•
Medical Laboratory Technology										•												
Mining Technology (1st yr.)			•						•	•				•		•				•	•	
Mining Technology (1st and 2nd yr.)			•						•					•								
Nuclear Engineering Tech. (1st yr.)			•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
Nuclear Engineering Tech. (1st & 2nd yr.)			•							•												
Nursing					•																	
Recreation and Parks														•	•							
Retailing			•																			
Science												•		•								
Sociology*								•		•							•	•				
Solar Heating and Cooling Technology (1st yr.)									•								•				•	
Solar Heating and Cooling Technology (1st and 2nd yr.)									•													
Steel Technology																	•					
Surveying Technology													•							•		
Wildlife Technology						•																

\*Community Services (Administration of Justice), Labor Studies, and Sociology are offered as *extended degree programs* for students wishing to pursue part-time (day or evening) study. Letters, Arts, and Sciences may also be taken as an extended degree program at all University locations. Interested students should write to the Undergraduate Admissions Office or the nearest Commonwealth Campus to request a special application form for extended degree programs.

†Four years of some baccalaureate degree majors.

\*\*Four years of all baccalaureate degree majors.

## **PENN STATE COMMONWEALTH CAMPUSES**

- \*UNIVERSITY PARK CAMPUS** University Park, PA 16802  
Area Code 814 865-4700
- ALLENTOWN CAMPUS** Academic Building, Fogelsville, PA 18051  
Area Code 215 285-4811
- ALTOONA CAMPUS** Smith Building, Altoona, PA 16603  
Area Code 814 946-4321
- BEAVER CAMPUS** Brodhead Road, Monaca, PA 15061  
Area Code 412 775-8830
- \*BEHREND COLLEGE** Erie (Station Rd., Wesleyville), PA 16563  
Area Code 814 899-1511
- BERKS CAMPUS** R.D. 5, Tulpehocken Road, P.O. Box 2150,  
Reading, PA 19608  
Area Code 215 375-4211
- \*CAPITOL CAMPUS** Middletown, PA 17057  
Area Code 717 787-7734
- DELAWARE COUNTY CAMPUS** 25 Yearsley Mill Road, Media, PA 19063  
Area Code 215 565-3300
- DuBOIS CAMPUS** College Place, DuBois, PA 15801  
Area Code 814 371-2800
- FAYETTE CAMPUS** P.O. Box 519, Uniontown, PA 15401  
Area Code 412 437-2801
- HAZLETON CAMPUS** Highacres, Hazleton, PA 18201  
Area Code 717 454-8731
- McKEESPORT CAMPUS** University Drive, McKeesport, PA 15132  
Area Code 412 678-9501  
Area Code 412 462-6401
- MONT ALTO CAMPUS** Mont Alto, PA 17237  
(Waynesboro) Area Code 717 749-3111
- NEW KENSINGTON CAMPUS** 3550 7th Street Rd.,  
New Kensington, PA 15068  
Area Code 412 339-7561
- OGONTZ CAMPUS** 1600 Woodland Road, Abington, PA 19001  
Area Code 215 886-9400
- SCHUYLKILL CAMPUS** State Highway, Schuylkill Haven, PA 17972  
Area Code 717 385-4500
- SHENANGO VALLEY CAMPUS** Shenango and Reno Streets,  
Sharon, PA 16146  
Area Code 412 981-1640
- WILKES-BARRE CAMPUS** P.O. Box 1830, Wilkes-Barre, PA 18708  
Area Code 717 675-2171
- WORTHINGTON SCRANTON CAMPUS** 120 Ridge View Drive,  
Dunmore, PA 18512  
Area Code 717 961-4757
- YORK CAMPUS** 1031 Edgecomb Ave., York, PA 17403  
Area Code 717 771-4586

\*Upper-division and graduate courses

THE PENNSYLVANIA STATE UNIVERSITY BULLETIN  
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## **\*UNIVERSITY CALENDAR**

### **WINTER TERM 1979**

#### **NOVEMBER 1978**

- 26 Sunday — Arrival date
- 27 Monday — Orientation and advising
- 28, 29 Tuesday, Wednesday — Registration
- 30 Thursday — Classes begin 8:00 a.m.

#### **DECEMBER**

- 19 Tuesday — Christmas and New Year's recess begins 9:55 p.m.

#### **JANUARY 1979**

- 3 Wednesday — Winter term classes resume 8:00 a.m.

#### **FEBRUARY**

- 21 Wednesday — Classes end 9:55 p.m.
- 22-24; 26 Thursday to Saturday; Monday — Final examinations

### **SPRING TERM 1979**

#### **MARCH**

- 4 Sunday — Arrival date
- 5 Monday — Orientation and advising
- 6, 7 Tuesday, Wednesday — Registration
- 8 Thursday — Classes begin 8:00 a.m.

#### **MAY**

- 16 Wednesday — Classes end 9:55 p.m.
- 17-21 Thursday to Monday — Final examinations

### **SUMMER TERM 1979**

#### **JUNE**

- 3 Sunday — Arrival date
- 4 Monday — Orientation and advising
- 5 Tuesday — Registration
- 6 Wednesday — Classes begin 8:00 a.m.

#### **JULY**

- 4 Wednesday — Independence Day Holiday (no classes)+

#### **AUGUST**

- 15 Wednesday — Classes end 9:55 p.m.+
- 16-18 Thursday to Saturday — Final examinations
- 25 Saturday — Commencement

\*This calendar is subject to change without notice. Although the University makes every effort to avoid conflicts with religious holidays in preparing the calendar for an academic year, such conflicts are sometimes unavoidable. When they occur, efforts are made to make special arrangements for the students affected.

+Wednesday, July 4, 1979 classes will meet on Wednesday, August 15, 1979.

## **FALL TERM 1979**

### **AUGUST**

- 27 Monday — Arrival date (new students)
- 28 Tuesday — Arrival date (continuing students)
- 28-31 Orientation and advising — Tuesday to Friday
- 29-31 Wednesday (noon) to Friday — Registration

### **SEPTEMBER**

- 3 Monday — Labor Day Holiday, no classes
- 4 Tuesday — Classes begin 8:00 a.m.

### **NOVEMBER**

- 12 Monday — Classes end 9:55 p.m.
- 13-16 Tuesday to Friday — Final examinations
- 22 Thursday — Thanksgiving

## **WINTER TERM 1980**

### **NOVEMBER**

- 25 Sunday — Arrival date
- 26 Monday — Orientation and advising
- 27, 28 Tuesday and Wednesday — Registration
- 29 Thursday — Classes begin 8:00 a.m.

### **DECEMBER**

- 19 Wednesday — Winter term recess begins 9:55 p.m.

### **JANUARY 1980**

- 3 Thursday — Winter term classes resume 8:00 a.m.

### **FEBRUARY**

- 20 Wednesday — Classes end 9:55 p.m.
- 21-25 Thursday to Monday — Final examinations



# UNIVERSITY ADMINISTRATION

JOHN W. OSWALD, A.B., Ph.D., LL.D., D.Sc., L.H.D. *President*

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## TWO-YEAR ASSOCIATE DEGREE MAJORS

The two-year associate degree majors provide concentrated instruction to prepare graduates for specialized assignments in business and industry or to give students a basic two-year education. These majors are offered at Commonwealth Campus locations as listed on page 2 of this bulletin. In addition, the Commonwealth Campuses offer up to two years of work in most of the baccalaureate degree majors offered by the University.

At present the University offers two-year majors in Agricultural Business; Business Administration; Clinical Health Services; Community Services; Computer Science; Forest Technology; Hotel and Food Service; Labor Studies; Letters, Arts, and Sciences; Mass Communications-Broadcasting; Mass Communications-Journalism; Medical Laboratory Technology; Nursing; Recreation and Parks; Retailing; Science; Sociology; Wildlife Technology; and twelve areas of engineering: Air Pollution Control Engineering Technology; Architectural Engineering Technology; Biomedical Equipment Technology; Chemical Engineering Technology; Electrical Engineering Technology; Highway Engineering Technology; Mechanical Engineering Technology; Mining Technology; Nuclear Engineering Technology; Solar Heating and Cooling Technology; Steel Technology; and Surveying Technology.

A description of the purposes, objectives, and content of each of the two-year majors is given on succeeding pages.

Most of Penn State's associate degree enrollment at present is concentrated in its engineering technology majors. The engineering technology graduate, a specialist in applied rather than theoretical engineering, is equipped to translate creative ideas into new machines, products, structures, and processes. He or she understands the basic scientific principles which are the tools of the graduate engineer and is acquainted with the production tools and materials of this skilled worker.

**STATEMENT OF BASIC ACADEMIC ADMISSIONS POLICIES**—Admission to University credit courses or degree candidacy at The Pennsylvania State University is governed by policies established by the University Faculty Senate. Although specific applications of these policies may vary from year to year, from location to location, and from program to program, all University admissions are governed by the following general policies:

1. As an institution of higher education, The Pennsylvania State University is committed to making post-high school education available to all who possess a high school diploma or its equivalent without restriction as to race, sex, religion, color, ancestry, national origin, ethnic origin, or handicap or age as provided by law.
2. The primary responsibility of the University is to residents of the Commonwealth of Pennsylvania. Consequently, within limits expressed from time to time by the Board of Trustees of the University, preference shall be given to Pennsylvania residents in the various admission processes.
3. In order to meet the variety of goals and objectives of the population, the spectrum of offerings is designed to enable persons with a variety of objectives — both degree and nondegree — to receive higher education. Although access to educational opportunities of the University is open to all, courses offered for credit are available to those holding a high school diploma or its equivalent. Policies governing admission to degree candidacy are established by the University Faculty Senate (with delegation of policies governing admissions to graduate programs to the Graduate Faculty of the University) under a general policy of offering admissions to those whose past academic performance indicates a reasonable probability of success.
4. Undergraduate students are admitted to either baccalaureate degree candidacy or associate degree candidacy. To be admitted to degree candidacy, the individual must present an academic performance record which indicates a reasonable probability of his or her success in his or her chosen program. In the case of freshman admission to undergraduate degree candidacy, performance is measured through the high school record and standardized test results. In the case of advanced standing admission, performance is measured either through success in non-degree programs and courses of the University or by success at some other institution of higher education.

5. Within the space available in particular programs and at particular locations, admissions shall be offered preferentially to those whose performance record indicates the highest probability of success in the chosen program — with this process continuing until all available spaces are filled. Although exceptions to this policy may be made from time to time (for example, recipients of scholarships with restricting qualifications), these exceptions may be made only for students who meet at least the minimum admission and entrance requirements.

6. If a college requires restrictions on its baccalaureate admissions, the priorities or quotas established must include provisions to consider qualified students in each of these groups:

Admissions Group I—Freshman Admissions: Students who hold a high school diploma or equivalent, who present fewer than 18 credits of baccalaureate work (from The Pennsylvania State University or another accredited institution), who meet minimum college entrance requirements, and who meet minimum college admission standards are considered in this group.

Admissions Group II—Penn State Advanced Standing Admissions: Students who 1) request baccalaureate degree readmission, presenting 18 or more credits; 2) request a change from The Pennsylvania State University associate degree to baccalaureate degree status, presenting 18 or more applicable credits (including Type II, The Pennsylvania State University associate degree graduates); or 3) request a change from The Pennsylvania State University provisional degree to baccalaureate status, presenting 18 or more applicable credits are considered in this group. In all Penn State advanced standing admissions, it is understood that the student must have a G.P.A. of at least 2.0 and meet the minimum entrance and advanced standing requirements of the college.

Admissions Group III—Other Advanced Standing Admissions: Students who 1) request changes from The Pennsylvania State University nondegree to baccalaureate status, presenting 18 or more applicable credits; or 2) have not been students at Penn State and request baccalaureate status at Penn State, presenting 18 or more applicable credits. In all advanced standing admissions it is understood that the student must have a G.P.A. of 2.0 and meet the minimum entrance and advanced standing requirements of the college.

Within these three groups, no special consideration will be given to any group; students will be admitted to the college on the basis of academic competition (e.g., SAT scores, grade-point averages, grades in required courses in the college, and other evidence predictive of baccalaureate degree performance where available, valid, and reliable).

7. To assure a proper educational mix of students and to further broaden the educational opportunities offered by the University, the University Faculty Senate and the University administration may from time to time authorize various specialized programs. These programs may permit students who do not meet the basic qualifications for admission to degree candidacy to be admitted to such candidacy. These programs may also permit, in selected situations, exceptional students who have not earned a high school diploma or its equivalent to enroll in University credit courses. Such specialized programs may include up to 10 percent of the total admission group for the University in any one year and up to a maximum of 15 percent of the admission to any geographic location of the University.

8. Within this general policy, colleges of the University, with the concurrence of the University Faculty Senate, may impose certain educational background requirements (Carnegie Units) which must be completed by an individual before being admitted to degree candidacy.

**ADMISSION REQUIREMENTS—*Freshman Admission*** — A person who holds a high school diploma or its equivalent, and who has not taken credit courses at an institution of higher learning, or a person who holds a high school diploma or its equivalent and who has taken less than 18 semester credits at an accredited college or university may be considered for admission as a freshman.

Applicants for admission to all associate degree programs must submit scores of the Scholastic Aptitude Test of the College Entrance Examination Board.

All applications should be addressed to the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802. Telephone: (814) 865-5471.

The University reserves the right to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

An applicant must state in writing whether he has attended any other institution of higher learning, even though advanced standing is not desired. Failure to indicate, at the time of registration, previous registration in another institution invalidates the admission.



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To be admitted to degree candidacy, the applicant must have completed certain education background requirements, called Carnegie Units or secondary school units. To determine whether you have the appropriate secondary school units required for your choice of a program of study, refer to the following page to the program of your choice. Then read across to determine the necessary units.

All students entering an associate degree program are required to pass a basic skills examination in English composition and in mathematics (arithmetic) within the first three terms after they matriculate. Students who are deficient in one or both of the basic skills will be identified in the preregistration testing program prior to enrollment in the first term of their program. Two courses are available to assist the student in passing the basic skills tests; English 4 (3 credits) and Mathematics 198B (3 credits). The examinations will be administered on all campuses during orientation in the summer and during the final examination period at the close of fall, winter, and spring terms. Students may take the examination whether or not they are enrolled in the basic skills courses. They may take the examination without penalty until they pass it but in no case more than four times. Failure to pass it results in the student being dropped from degree status at the end of the third term.

*Admission with Advanced Standing* — A person who has acquired at least 18 semester credits at an accredited college or university may be considered for admission with advanced standing.

The requirements for admission for such a student are the same as for a beginning freshman student as far as the secondary school record is concerned. In all cases where work has been taken at other institutions, an official transcript from each place of attendance must be submitted directly to the Undergraduate Admissions Office by the institutions attended. The latter must include evidence that the student was honorably dismissed and was in good academic standing at the time of leaving.

Associate degree programs have a limit on the number of credits that may be accepted by transfer from accredited institutions. Information on credit limitations may be obtained from the academic official responsible for a particular program. Grades are not transferred with credits from other institutions and do not, therefore, enter the calculation of the term or cumulative average at this University.

*Provisional Student (Degree Seeking)* — An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admission as a degree candidate may enroll in credit courses at the University. A provisional student must apply to enroll in courses every term. (After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a provisional student can be used to fulfill the degree requirements.) A provisional student may enroll in credit courses if the following criteria are met:

1. The student is making satisfactory progress towards admission as a degree candidate. Progress is satisfactory if a student has earned 18 credits with a minimum grade-point average of 2.00 (on a 4.00 scale). If a student has earned less than 2.00, the student is given a warning. A student who has earned 27 credits with a grade-point average of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent term.
2. There is space available after degree candidates have been accommodated.
3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons may petition for an exception to the policy.

Note: An applicant holding a baccalaureate degree or higher is not eligible to enroll as a provisional student. The applicant is referred to the graduate nondegree program.

*Nondegree Student* — An applicant holding a high school diploma or its equivalent may be permitted to enroll in credit courses (either for credit or audit) at the University. A person dropped as a degree candidate from the University for poor scholarship may take courses as a nondegree student to improve a grade-point average in order to apply for reinstatement as a degree candidate at the University. However, a student so dropped may not register as a nondegree student until one

## TWO-YEAR ASSOCIATE DEGREE MAJORS

SECONDARY SCHOOL UNITS REQUIRED FOR ADMISSION  
TO ASSOCIATE DEGREE PROGRAMS

	English	Math. (A)*	Math. (B)+	Math. (C)**	Science	Other Subjects	Total
Agricultural Business	3					12	15
Air Pollution Control Engineering Technology	3	2				10	15
Architectural Engineering Technology	3	2				10	15
Biomedical Equipment Technology	3	2				10	15
Business Administration (2-year)	3		2			10	15
Chemical Engineering Technology	3	2				10	15
Clinical Health Services	3			2	2++	8	15
Community Services (Administration of Justice)	3					12	15
Computer Science	3	2				10	15
Electrical Engineering Technology	3	2				10	15
Forest Technology	3		2			10	15
Highway Engineering Technology	3	2				10	15
Hotel and Food Service	3					12	15
Labor Studies	3					12	15
Letters, Arts, and Sciences	3					12	15
Mass Communications-Broadcasting	3					12	15
Mass Communications-Journalism	3					12	15
Mechanical Engineering Technology (Drafting and Design Technology)	3	2				10	15
Medical Laboratory Technology	3	2				10	15
Mining Technology	3	2				10	15
Nuclear Engineering Technology	3	2				10	15
Nursing (2-year at Behrend College)	3			2	2	8	15
Recreation and Parks	3					12	15
Retailing	3					12	15
Science (2-year) (Radiologic Technologist Radiographer)	3	2				10	15
Sociology (2-year)	3					12	15
Solar Heating and Cooling Technology	3	2				10	15
Steel Technology	3	2				10	15
Surveying Technology	3	2				10	15
Wildlife Technology	3		2			10	15

\*Math. (A) requirements may be satisfied by at least 2 units of mathematics: 1 unit of algebra, and 1 additional unit in any combination of advanced algebra, plane geometry, solid geometry, or trigonometry.

+Math. (B) requirements may be satisfied by any 2 units of mathematics, but it is strongly recommended that the 2 units be 1 of algebra and 1 of plane geometry.

\*\*Math. (C) requirements may be satisfied by 1 unit of algebra and 1 additional unit in mathematics.

++Biology and chemistry are recommended.



GENERAL INFORMATION

term (excluding summer term) has elapsed from the time of the drop action. Such students may register for six (6) credits per term (8 credits at Capitol Campus) until degree status is attained.

A nondegree student may apply to enroll in courses each term if the following criteria are met:

- 1. The applicant has completed the prerequisites for the courses to be taken or can present evidence of ability to follow successfully the courses to be taken.
- 2. There is space available after degree candidates and provisional students have been accommodated.
- 3. The student has not been dismissed or suspended for nonacademic reasons from any college or university. However, a person who has been dismissed or suspended from another college or university for disciplinary reasons may petition for an exception to the policy.

Note: Provisional students (degree seeking) and nondegree students are subject to the same tuition charges as regular students. The Academic Policies and Procedures approved by the University Faculty Senate apply to provisional and nondegree students as stated.

An individual desiring to take associate degree courses as a provisional student (degree seeking) or nondegree student should submit the appropriate application for admission. An application form may be obtained from the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802, or from the office of the director of any Commonwealth Campus of The Pennsylvania State University.

DIVISION OF UNDERGRADUATE STUDIES—This division is an academic unit which offers the following programs and services:

*Freshman Testing, Counseling, and Advising* for all new freshmen. Results of comprehensive testing are used in individual academic counseling to help evaluate each student’s educational objectives and to plan course schedules for the first term.

*Enrollment and Registration.* Students whose interests or career objectives change can request that they be enrolled in 2-DUS (Division of Undergraduate Studies). Specialized academic advising in DUS accompanies students’ attendance in regular courses until students choose a new program and meet its academic standards for transfer.

*Academic Advising and Counseling* are available to all students, including provisional students who will eventually seek admission to a degree-granting program.

*Undergraduate Academic Information* is coordinated and disseminated through DUS to assist with and promote understanding of students’ academic advising needs.

GRADING SYSTEM—Grades shall be reported by the following symbols: A, B, C, D, and F.

Grade	Quality of Performance	Grade-Point Equivalent
A	Excellent	4
B	Good	3
C	Satisfactory	2
D	Poor	1
F	Failure	0

GRADUATION REQUIREMENTS—In order to be graduated, a student must complete the course requirements of his major and earn at least a C average (a grade-point average of 2.00) for all courses.

DEGREES—The associate degree majors outlined in this catalog lead to the following degrees: Associate in Agricultural Business, Associate in Business Administration, Associate in Clinical Health Services, Associate in Community Services, Associate in Computer Science, Associate in Engineering, Associate in Forest Technology, Associate in Hotel and Food Service, Associate in

Labor Studies, Associate in Letters, Arts, and Sciences, Associate in Mass Communication-Broadcasting, Associate in Mass Communications-Journalism, Associate in Medical Laboratory Technology, Associate in Mining Technology, Associate in Nursing, Associate in Recreation and Parks, Associate in Retailing, Associate in Science, Associate in Sociology, Associate in Steel Technology, and Associate in Wildlife Technology.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE CAPITOL CAMPUS** — In addition to receiving an education preparing him for employment, the graduate of an associate degree program may also qualify for admission to various programs leading to a baccalaureate degree from Penn State's Capitol Campus. Those anticipating admission to Capitol Campus should inquire at the Capitol Campus Admissions Office late in their freshman year or early in their sophomore year concerning baccalaureate program course requirements.

The following associate programs, with electives in English composition, college algebra, and statistics, are acceptable toward the baccalaureate degree in Business Administration offered at Capitol Campus: Agricultural Business, Business Administration, Computer Science, Hotel and Food Service, Manufacturing Technology, Medical Laboratory Technology, Nursing, Retailing, and Steel Technology.

Graduates of the associate programs of Air Pollution Control Engineering Technology, Architectural Engineering Technology, Biomedical Equipment Technology, Chemical Engineering Technology, Electrical Engineering Technology, Highway Engineering Technology, Mechanical Engineering Technology, and Surveying Technology may wish to consider continuing at the Capitol Campus in a program of study in engineering technology leading to a Bachelor of Technology degree.

The following associate degrees are also acceptable toward admission to programs leading to a baccalaureate degree at Capitol Campus: Letters, Arts, and Sciences; Mass Communications-Broadcasting; Mass Communications-Journalism; and Sociology.

## STUDENT WELFARE

**ORIENTATION PROGRAM**—At the opening of the fall term all new students participate in an orientation program. In addition to becoming acquainted with the new environment in which they will live and study, students receive instruction and counseling concerning their courses of study, participation in extracurricular activities, and the cultural opportunities open to them. Registration is also held during this period.

**STUDENT GOVERNMENT**—Representative student leadership is provided on each campus of the University by a student government association, which functions through officers and representatives elected from and by the student body. In addition to their involvement in student programs at their local campuses, student officers and delegates from University campuses convene several times annually. These meetings provide for an exchange of information among the various student government associations and for system-wide coordination in student government and student activities.

**STUDENT CONDUCT**—The University regards as serious offenses all acts of unethical, immoral, dishonest, or destructive behavior, as well as violations of University regulations as set forth in each campus's student handbook and in the *Policies and Rules for Students*, a copy of which is available to each student upon registration.

**INSURANCE PROTECTION WHILE ATTENDING THE UNIVERSITY**—The Pennsylvania State University is an instrumentality of the Commonwealth performing its function of education. It is not liable for the negligence of its officers, servants, and employees when in the exercise of public or governmental powers or in the performance of public or governmental duties incident to the general educational work of the University.

## GENERAL INFORMATION

Any student who desires insurance protection while in attendance at the University (1) for accident and health and/or (2) for loss of property by fire or theft should arrange personally for whatever insurance seems desirable through an agency of his or her choice. Accident and health programs are available under the sponsorship of the Undergraduate or Graduate Student Government Organizations.

**STUDENT ACCIDENT / TRIP INSURANCE**—Short term group trip accident insurance is available to students who are not otherwise covered. Students taking course-connected class trips, or taking group trips with a student organization registered with the Office of Student Activities, may obtain around-the-clock coverage for accidental death and dismemberment, as well as accidental medical expenses. This insurance is available for the duration of the trip. Information about obtaining coverage and paying premiums is available from your instructor, campus business office or the University risk manager.

**HEALTH SERVICES**—The University Health Service assists in promoting and maintaining the health of students.

Every new full-time student must successfully complete a physical examination before being permitted to register for classes at the University.

The health services of the University are made available to students in accordance with a statement provided by each campus, pertinent to that campus, and published in its student handbook.

The University does not obligate itself for payment of medical services other than those provided by personnel employed or retained by the University and in facilities owned or contracted for by the University. Treatment provided in contract facilities must be authorized by the campus director, dean of student affairs, or nurse.

Students are urged to protect themselves against medical expenses that may result from injury or illness by arranging for personal insurance coverage.

**CAREER DEVELOPMENT AND PLACEMENT**—The Career Development and Placement Center assists students in continual evaluation of their educational and career plans as they progress through college and helps them identify sources of personal or academic difficulty which may interfere with their progress. Individual as well as group educational and career counseling programs are available to students.

A Student Affairs staff member at each campus has responsibility for providing placement assistance for associate degree graduates. Services include bringing employers to the campus to interview graduates for permanent employment, providing job information, and assisting students in preparing for job interviewing. The Career Development and Placement Center at the University Park Campus supplies prospective employers (national, state, and local) with information concerning the associate degree programs and works cooperatively with the Commonwealth Campuses in assisting graduates to locate suitable employment.

## STUDENT AID

In addition to the student aid information provided below, students may wish to consult the *Student Financial Aid* brochure provided in the Application for Admission packet sent to each applicant. After reviewing the brochure, additional questions should be directed to the Office of Student Aid, 135 Boucke Building, on the University Park Campus, or to the Office of Student Affairs at a Commonwealth Campus.

### AID PROGRAMS AVAILABLE TO ASSOCIATE DEGREE CANDIDATES

#### GRANTS (aid sources not requiring repayment)

**Basic Educational Opportunity Grant (BEOG)**—BEOG is the major federal grant program available to undergraduates. This award is available to undergraduates pursuing their first baccalaureate or associate degree on at least a half-time basis (4 credits per term).



*Pennsylvania Higher Education Assistance Agency Grant (PHEAA)*—This is a grant established by the Commonwealth to assist undergraduates who have a financial need as defined by PHEAA guidelines. Applicants must be residents of Pennsylvania.

NOTE: Non-Pennsylvania students should contact their state higher education assistance agencies for information on state grants available for attending Penn State.

*Supplemental Educational Opportunity Grant (SEOG)*—This grant is available to students with high documented needs. The maximum SEOG is \$1,000 with an overall maximum of \$4,000 for undergraduate study.

## LOANS

*Guaranteed Student Loan Program (GSL)*—The GSL is a federally-subsidized loan program which offers students attending on at least a half-time basis the opportunity to borrow money for their education. An undergraduate may borrow up to \$2,500 per year with a maximum of \$7,500 for undergraduate studies. The \$25,000 maximum income limit for automatic eligibility for the interest subsidy benefit has been removed. Under the provisions of the Middle Income Assistance Act, effective November 1, 1978, the GSL is available on an interest-free basis to all eligible students for the period of enrollment and for the grace period before repayment begins. Repayment begins nine months after the termination of the student's education at an interest rate of 7 percent per year simple interest.

*National Direct Student Loan (NDSL)*—This program provides loans of up to \$1,250 per year with an overall maximum of \$5,000 for undergraduates. Repayment starts nine months after termination of the student's education at an interest rate of 3 percent per year simple interest. Postponement of repayment and loan cancellation may be arranged for certain types of employment following graduation.

*University Loans*—University loans are funds established by donors to help students who have a documented financial need. These loans are divided into two categories: short-term and long-term.

1. Short-term loans assist students in meeting unanticipated expenses which relate to the acquisition of a college degree. These loans are interest-free and repayable on a short-term basis — 30, 60, or 90 days.
2. Long-term loans help needy students meet the educational and living expenses required to attain a college degree. Repayment starts immediately after the student completes his or her studies at a simple interest rate of 6 percent per year.

## EMPLOYMENT

*College Work-Study Program (CWSP)*—The CWSP is a form of federal aid which allows a student to earn a portion of the documented financial need through approved CWSP jobs. This is a nonrepayable source of aid since the student is paid an hourly wage for his or her employment. Earnings from this program when combined with other sources of student aid may not exceed the documented need derived from the Financial Aid Form (FAF).

*Student Employment*—Students who are interested in part-time employment on campus or in the State College area should contact the Student Employment Office, 105 Boucke Building, University Park, PA 16802, or contact the dean of student affairs at Commonwealth Campuses.

## SCHOLARSHIPS

*University Scholarships*—University scholarships are awarded on the basis of superior high school or college academic performance and in most cases documented financial need. They are awarded either by the scholarship committees in the various academic colleges of Penn State, by the Freshman or Faculty Senate Scholarship Committees, or the Commonwealth Campus Scholarship Committees.



## GENERAL INFORMATION

### HOW TO APPLY

After completing the application for admission to the University, each student seeking aid consideration should complete the forms necessary for each aid program being sought.

#### I. Aid Awarded/Coordinated by the States

PHEAA grant (Pennsylvania residents only)

Other state grant/scholarship programs

Guaranteed Student Loan

(Undergraduates)

Pennsylvania residents should complete the combined Pennsylvania Higher Education Assistance Agency/Basic Educational Opportunity Grant Application. Students currently receiving PHEAA grants will receive renewal applications by mail from the PHEAA agency. Regular applications are available from high school guidance counselors, the Office of Student Aid, and the dean of student affairs at Commonwealth Campuses in addition to the Pennsylvania Higher Education Assistance Agency. Non-Pennsylvania students should contact their state's Higher Education Agency for information on aid programs available to them as Penn State students.

(PA and non-PA residents)

Contact a local bank or lending institution for application forms for the Guaranteed Student Loan Program. After completing the forms, submit them to the Office of Student Aid, 135 Boucke Building, University Park, PA 16802, along with a stamped envelope addressed to the lender.

#### II. Aid Awarded by the Federal Government

##### BEOG

(All undergraduate students)

Students who have completed the Financial Aid Form (FAF) or the PHEAA grant application are automatically considered for the BEOG program. Students who have not filed the FAF or PHEAA grant application should complete the BEOG application. After receiving the Student Eligibility Report (SER), which designates eligibility for a BEOG, follow the instructions contained on the SER to finalize the award. Applications are available from high school guidance counselors, the Office of Student Aid, or the dean of student affairs at Commonwealth Campuses.

#### III. Aid Awarded by The Pennsylvania State University

Supplemental Educational Opportunity Grant (SEOG)

National Direct Student Loan (NDSL)

College Work-Study Program (CWSP)

University loans and scholarships

(All students)

Complete the Financial Aid Form (FAF).

File by Feb. 15.

Note: The FAF is the only form necessary for the entering freshman to complete to be considered for the above University aid sources. The FAF is available from high school guidance counselors, the Office of Student Aid, and the dean of student affairs at Commonwealth Campuses.

(All students except entering freshmen)

Complete the Office of Student Aid's Financial Aid Application. Students may indicate on this application the type of aid they are seeking, with the exception of University scholarships. File by April 1. The application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

(All students except entering freshmen)

Complete the University Scholarship Application. Since funds are limited, applications are only encouraged from those students with a cumulative grade-point average of 3.0 or higher. File by Feb. 15. This application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

## IV. Private Aid Sources

All students are urged to explore local scholarship/grant opportunities as well as any private low-interest loan funds offered by local employers and civic organizations.

## HOW MUCH DOES IT COST TO ATTEND PENN STATE?

One the major concerns of students and their parents is knowing how much it will cost to attend Penn State for an academic year. The following itemized listing of expenses, although prepared for the 1978-79 academic year, may be used as a basic guide for your planning. Students may find that some of the costs vary according to individual needs and circumstances.

## ESTIMATED STUDENT BUDGETS — 1978-79

	<i>Residence Halls or Off-Campus Housing (All Campuses)</i>	<i>Living at Home</i>
Commonwealth Campus Tuition (including Behrend College)	\$1,179*	\$1,179*
Room & Board	1,566	1,041
Books & Supplies	240	240
Clothing & Laundry, Transportation, Personal Maintenance, Medical, & Recreation	876	876
Total*	\$3,861	\$3,336

\*For non-Pennsylvania residents the non-resident undergraduate tuition figure of \$2,748 should be substituted. The total estimated budget for an out-of-state undergraduate student at University Park Campus is \$5,430.

The 1978-79 tuition at University Park is \$1,368.

## STUDENT RIGHTS AND RESPONSIBILITIES

The Office of Student Aid at Penn State administers and coordinates the aid programs according to applicable federal and state regulations and University policies which guarantee each student equal access to financial assistance. The Office of Student Aid employs the standard need analysis services of the College Scholarship Service to assess the aid eligibility of student applicants ensuring equity of treatment among all applicants. The University does not discriminate on the basis of race, creed, color, national origin, handicap, age, or sex in any of its policies, practices, or procedures.

Eligibility for aid is contingent upon the student's financial need for assistance to meet educational costs. Each program has specific eligibility requirements which must be met before funds are awarded. In addition to financial need as a criterion for receiving aid, a student must be enrolling as a degree or provisional student. Nondegree students are not eligible to receive aid at Penn State. The University may require an official copy of the Federal Income Tax Form 1040 to verify eligibility for aid.

Satisfactory academic progress must be maintained for continued consideration for assistance. Although satisfactory progress is generally measured by institutional standards, certain aid programs have additional expectations which must be met for continued support. The student is encouraged to carefully read all aid application materials for further information about maintaining eligibility.

The Office of Student Aid assumes that all aid applicants will keep apprised of all application deadlines pertaining to the aid sources they are seeking. Because limited funds are available, applications filed after the applicable deadline dates are considered only as funds permit. On-time applicants receive first consideration. Some aid programs have flexible application deadlines

GENERAL INFORMATION

which permit students to receive consideration at most times during the year (for example, the GSL and BEOG programs). Current and prospective aid recipients are strongly encouraged to keep well-informed of aid application procedures through aid publications, news media, and agencies providing aid information such as the Office of Student Aid at University Park and the Office of Student Affairs at Commonwealth Campuses.

Aid is never automatically awarded for subsequent years. Students must reapply each year for funds. Students who plan to attend the summer term must file separate applications to be considered for almost all aid programs. The major exceptions to this requirement are as follows:

- 1. Entering freshmen seeking aid awarded by the University (see "How to Apply" above) must file only the FAF to receive consideration for the summer term if they have been admitted to the University specifically to begin during the summer term; and
- 2. The BEOG program has no separate summer application and is generally awarded to students during the fall-winter-spring academic year. (BEOG recipients not attending the entire fall-winter-spring year should contact the Office of Student Aid to determine if a summer payment is possible.)

One of the goals of the Office of Student Aid is to help financial aid recipients receive a financial aid package which will meet the students' documented financial need. The financial aid package can be composed of federal aid, state grant monies, private award sources, or any other source of funds available to the student, including earnings from University employment.

It is the responsibility of the Office of Student Aid, however, to assure the Federal Government that federal aid recipients will not be permitted to retain financial aid *exceeding* the students' need. Although repayment was necessary for fewer than one percent of Penn State students in the previous year, students should be aware that if the aid received is in excess of need, they will be notified of their responsibility to return the excess amount to the University.

TUITION AND OTHER CHARGES

*NOTE: The University reserves the right to revise tuition and charges without further notice. Tuition and charges for baccalaureate and graduate programs are listed separately in the Baccalaureate Degree Programs, Graduate Degree Programs, and Capital Campus catalogs. Penn State has four ten-week terms each year. Students normally attend three terms per year.*

TUITION—Tuition per term for associate degree students:

	<i>Pennsylvanians</i>	<i>Non-Pennsylvanians</i>
8 or more credits:		
University Park Campus	\$456	\$916
Other Commonwealth Campuses	393	916
7 or fewer credits:		
University Park Campus—rate per credit	57	115
Other Commonwealth Campuses— rate per credit	43	115

*Enrollment Charge*—All entering students who plan to enroll for 8 or more credits are required to pay a nonrefundable enrollment charge of \$52 upon acceptance of an offer of admission.

*General Deposit*—All full-time undergraduate students are required to make a general deposit of \$50 at the time of admission. This deposit will serve to safeguard the property and equipment used by students in their course of study. It will be retained until a student withdraws or is graduated.

The deposit, less any charges for equipment damages, losses, and forfeitures, will be refunded early in the subsequent term to the student who has withdrawn or been graduated. The refund will be made by check and mailed to the student's home address. If at any time the balance of the deposit falls below the minimum amount of \$15, the deposit must be replenished.

*Credit by Examination*—A charge of \$15 per credit is made for credit by examination. For evaluation of credits completed elsewhere a charge of \$20 is made for those applying for admission and a charge of \$3 for those who are already matriculated.



## TUITION AND OTHER CHARGES

*Student Activities*—Student activities charges are determined by elected representatives of the student body, together with a faculty representative.

*Change of Schedule Charge*—Unless a change is necessitated by the University, a charge of \$2 is made for each change of schedule.

*Late Registration Charge*—Unless the delay is unavoidable, \$10 is charged a student who fails to register on the appointed day.

*Other Expenses*—Books and supplies must be secured by the student. These vary from approximately \$60 per term, depending upon the program.

**TERMS OF PAYMENT**—Tuition and charges, including room and board, are due and payable in advance of each term at the Office of the Bursar, 103 Shields Building, University Park, PA 16802. Registration for courses may not be completed until tuition and charges are paid.

Approximately six weeks in advance of each term, the University will mail to each continuing and newly admitted student of record an estimated bill for tuition and, where applicable, residence hall charges. Payment by mail is encouraged before the established deadline. The receipt is returned to the student by mail and will permit registration for the designated number of credits. This receipt is likewise authorization to obtain, where applicable, the residence hall key and meal ticket. If checks tendered for payment of tuition and charges are not paid upon presentation to the maker's bank, the student will automatically incur the late payment fee of \$25, and the receipt previously mailed will be considered null and void.

Any student who does not fulfill payment of obligations by the deadline established may be charged the late payment fee of \$25. This charge for late payment also applies to unpaid student supplemental charges. Students whose accounts are delinquent for more than ten days are subject to suspension from the University.

**WITHDRAWALS AND REFUNDS**—In the event of withdrawal, charges for tuition will be refunded under the following policy:

Refund of 80 percent upon withdrawal before the end of the first week of the term (seventh consecutive calendar day from the first day of classes) and a decrease of 20 percent for each week thereafter up to and including the fourth consecutive calendar week. No amount will be refunded for withdrawal after the fourth consecutive calendar week of the term.

Under this policy if a student is enrolled for 8 or fewer credits and drops 1 or more credits, refunds will be determined in accordance with the above policy.

Any refund policy related to adjustments in room and board will be a part of the housing contract.



## MAJORS

### GENERAL DEGREE REQUIREMENTS

There are a number of areas in which a certain level of competence is expected of all recipients of associate degrees. Therefore, all associate degree programs of the University demand the satisfactory completion of the following requirements:

- 3 credits in the social sciences
- 3 credits in the arts and humanities
- 3 credits in English
- 3 credits in speech communication
- 6 credits in the physical sciences, biological science, or mathematics
- 3 credits in general education electives\*

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\*If the student has not had courses in all three areas of physical science, biological science, and mathematics either in high school or in his or her associate degree program, these three "general education" credits must be used to remedy this deficiency. Otherwise, they may be in any of the areas listed above.

**RESERVATIONS**—The University reserves the right to make such program or class changes as may become necessary because of insufficient enrollment or other contingencies. The University also reserves the right to make any necessary changes in tuition and charges without prior notice. Courses and programs described and listed in this catalog are also subject to change without notice.

## AEROSPACE ENGINEERING TECHNOLOGY

This major prepares students for careers as supportive personnel in the aerospace field. Graduates will work as designers and laboratory technicians in the areas of aircraft and missile structures, aerodynamics, and propulsion.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 1, Engineering Drawing	2	Cmp. Sc. 1, Basic Computer Programming	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 12, Spatial Analysis	2
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	<hr/> 12		<hr/> 12
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Aersp. 800, Applied Aerodynamics	3	Aersp. 803, Technical Aerodynamics	3
Aersp. 806, Computer Applications to Aerospace Engineering	3	Aersp. 809, Aerospace Laboratory	2
E.Mch. 811, Elementary Mechanics	3	E.E. 800, Applied Electricity	2
Math. 803, Technical Calculus	3	E.Mch. 813, Strength and Properties of Materials	3
	<hr/> 12	I.E. 811, Manufacturing Materials and Processes	3
			<hr/> 13
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Aersp. 802, Aircraft Structural Analysis	3	Aersp. 807, Aircraft Structural Design	3
Aersp. 804, Aircraft Propulsion	3	Sp.Com. 200, Effective Speech	3
Aersp. 808, Electronic Instrumentation	3	Humanities selection	3
Social science selection	3	Technical selection	3
	<hr/> 12		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## ASSOCIATE DEGREE MAJORS

### AGRICULTURAL BUSINESS

This major prepares students for service in commercial farming and businesses which serve agriculture. The latter includes businesses which process and market farm products, as well as those which provide farmers with all kinds of production supplies, such as feeds, fertilizers, chemicals, biological products, and machinery. Training is also provided in agricultural business organization, management, and sales. This basic program is supported with courses in crop and livestock production and in agricultural engineering.

To be eligible to receive the associate degree, a student must have completed the prescribed major of 62 credits. The first three terms are offered at selected Commonwealth Campuses. The last three terms are offered at the University Park Campus.

FIRST TERM	Credits	SECOND TERM	Credits
Acctg. 801, Introductory Accounting; or Acctg. 101, Introductory Financial Accounting	3	Biological science selection	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	B.Law 843 Introduction to Business Law; or B.Law 243, Legal Environment of Business	3
Social science selection	3	Engl. 20, Composition and Rhetoric II; or selection	3
	<hr/>	Sp.Com 200, Effective Speech	3
	9		<hr/>
			12
THIRD TERM	Credits	FOURTH TERM	Credits
Chem. 11, Introductory Chemistry	3	Ag.E. 800, Farm Power	2
Humanities selection	3	Ag.E. 801, Farm Structures and Utilities	3
Elective	3	Ag.Ec. 803, Introduction to Agricultural Business	3
	<hr/>	Elective	3
	+9		<hr/>
			11
FIFTH TERM	Credits	SIXTH TERM	Credits
Ag.Ec. 2, Marketing	3	Ag.Ec. 6, Farm Management	3
A.I. 800, Livestock Production	2	Ag.Ec. 800, The Agricultural Economy	3
Pty.Sc. 801, Poultry Production	2	Plt.Sc. 801, Production of Horticultural Crops	3
D.Sc. 802, Dairy Production	2	Plt.Sc. 802, Use of Agricultural Chemicals	3
Plt.Sc. 800, Field and Forage Crop Production	3		<hr/>
	<hr/>		12
	+12		

\*Students will be placed in Engl. 4 or Engl. 10 on the basis of English Placement Test scores.

+A student may schedule up to 12 credits in these terms. If additional credits are scheduled, suggested courses are mathematics, economics, business management, or biological science.

## AIR POLLUTION CONTROL ENGINEERING TECHNOLOGY

This major prepares students for positions as air pollution control technicians, working for a local, state, or federal agency. Technicians may be responsible for the calibration, installation, and operation of air sampling and monitoring equipment, investigation of complaints, plant inspections, and source evaluation. As an industrial air pollution control technician, these same responsibilities may be required with the addition of evaluation and monitoring of gas cleaning equipment and performance.

FIRST TERM		SECOND TERM	
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Cmp.Sc. 1, Basic Computer Programming	1
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	—		—
	12		11
THIRD TERM		+FOURTH TERM	
Chem. 13, Chemical Principles	3	Chem. 23, Introduction to Modern Analytical Chemistry	4
Chem. 15, Experimental Chemistry	1	E.E. 801, Fundamentals of D.C. Circuits	3
Math. 803, Technical Calculus	3	E.Mch. 810, Basic Mechanics, or E. Mch. 811, Elementary Mechanics	2-3
Sp.Com. 200, Effective Speech	3	Phys. 150, Technical Physics	3
Social science selection	3		—
	—		12-13
	13		
FIFTH TERM		SIXTH TERM	
Ch.E. 802, Chemical Technology	3	E.E. 814, Electrical Circuits	4
Ch.E. 830, Industrial Chemistry	3	E.E. 818, Electrical Circuits Laboratory	1
E.E. 809, D.C. Circuits Laboratory	2	M.E. 882, Air Resource Management	2
Humanities selection	3	M.E. 884, Sampling and Monitoring Program	2
	—	Meteo. 303, Introductory Meteorology	3
	11		—
			12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

+Second year to be taken at Berks Campus.



**ARCHITECTURAL ENGINEERING TECHNOLOGY**

This two-year program is designed to provide technically trained personnel between the level of high school graduate and professional architectural engineer or architect to support the architectural design and construction industries. Architectural engineering technicians work under the supervision of a graduate architect or architectural engineer. They translate sketches and design concepts into working drawings and renderings. To do so, they need basic skills in structural and environmental systems design and layout, knowledge of building materials and equipment characteristics and performance, as well as the training in drafting techniques required for the realization of final drawings.

The graduates of this major are prepared for employment in architectural, building engineering, or industrialized housing firms. A total of 71-72 credits are required for graduation.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
A.E. 801, Building Materials	3	A.E. 802, Methods of Construction	3
E.G. 3, Architectural Graphics	2	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Math. 802, Technical Mathematics	3
Engr. 2, Engineering Orientation	1	Phys. 150, Technical Physics	3
Math. 801, Technical Mathematics	3		<hr/>
	<hr/>		12
	12		

THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
A.E. 803, Plumbing and Fire Protection	3	A.E. 804, Heating, Ventilating and Air Conditioning Layout	3
E.Mch. 811, Elementary Mechanics	3	A.E. 814, Steel Construction	3
Math. 803, Technical Calculus	3	Cmp.Sc. 101, Introduction to Algorithmic Processes	3
Phys. 151, Technical Physics	3	Social science selection	3
	<hr/>		<hr/>
	12		12

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
A.E. 812, Building Lighting and and Electrical Layout	3	A.E. 807, Advanced Construction Methods	3
A.E. 815, Concrete Construction	3	A.E. 810, Architectural Engineering Office Practice	3
Sp.Com. 200, Effective Speech	3	Humanities selection	3
Technical selection	2-3	Technical selection	3
	<hr/>		<hr/>
	11-12		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

# BIOMEDICAL EQUIPMENT TECHNOLOGY

This major prepares students for careers as biomedical equipment technicians, men and women responsible for specifying, calibrating, maintaining, and replacing clinical electronic equipment used in patient care. Modern health care facilities now have complex electronic instrumentation and apparatus located in virtually every diagnostic and patient treatment area. While these innovations result in improved patient care, they also require extensive maintenance procedures, new equipment calibration, complex servicing and repair, as well as attention to patient and operator safety. A total of 75 credits are required for graduation.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 5, Experimental Methods for Engineers; or if not available, Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		11
	<hr/> 12		
THIRD TERM	Credits	FOURTH TERM	Credits
Cmp.Sc. 1, Basic Computer Programming	1	Biol. 41, Physiology	3
E.E. 814, Electrical Circuits	4	Chem. 11, Introductory Chemistry	3
E.E. 818, Electrical Circuits Laboratory	1	E.E. 807, A.C. and Electronics Laboratory	2
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3	E.E. 810, Fundamentals of Semiconductors	3
Math. 803, Technical Calculus	3		11
	<hr/> 12		
FIFTH TERM	Credits	SIXTH TERM	Credits
B.E.T. 801, Physiological Transducers	3	B.E.T. 802, Biomedical Instrumentation and Systems	3
E.E. 816, Linear Electronic Circuits	3	B.E.T. 804, Medical and Clinical Equipment	3
E.E. 821, Linear Electronics Laboratory	1	Humanities selection	3
Sp.Com. 200, Effective Speech	3	Technical selection	3
Social science selection	3		12
	<hr/> 13		
SEVENTH TERM (SUMMER)	Credits		
B.E.T. 803, Biomedical Equipment Laboratory (Internship)	4		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## BUSINESS ADMINISTRATION

This two-year, college-level academic program is designed to provide instruction in business administration that fulfills the requirements of various levels of responsibility higher than that held by high school graduates.

The primary objective of this major is to provide a managerially oriented program with sufficient communicative and mathematical skills, socially relevant course work, and advanced courses in specific business specialties to develop a well-rounded graduate.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	12
*Engl. 4, 10, 826; Sp.Com. 200	
B. Social sciences, humanities	9
History, humanities, political science, psychology, sociology selection	
C. Physical education	2
II. Requirements for the Major (45 credits)	
A. General	30
Econ. 2 or 4; Computer Science; Math. 800 or 17; Acctg. 801, 802; B.Law 843; Fin. 807; Mgmt. 800; Mktg. 800; Q.B.A. 101 or 801	
B. Specialization	15
Students will select five courses from the following list according to their area of specialization: Acctg. 803, 806, 807; B.A. 803; B.Law 850; B.Log. 102, 104, 206; Fin. 108, 210; Ins. 800, 810, 820, 830; I.B. 862; Mktg. 801, 802, 803, 804, 805, 806, 807; Mgmt. 801, 802; Q.B.A. 102; R.Est. 800, 810, 830	

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\*Students will be placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students not required to take Engl. 4 will take Engl. 20.

## CHEMICAL ENGINEERING TECHNOLOGY

This major prepares graduates for positions as assistants to chemists and chemical engineers, assistants in research and control laboratories, and trainees for future supervisory positions in manufacturing and production.

It provides the training necessary for such positions, including a reasonable proficiency in basic sciences, mathematics, communication skills, and the basic principles of chemical engineering technology.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3-4
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Cmp.Sc. 1, Basic Computer Programming	1
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	<hr/> 12		<hr/> 11-12
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Ch.E. 830, Industrial Chemistry	3	Ch.E. 800, Technical Calculations	3
Chem. 13, Chemical Principles	3	Chem. 23, Introduction to Modern Analytical Chemistry	4
Chem. 15, Experimental Chemistry	1	Phys. 150, Technical Physics	3
Math. 803, Technical Calculus	3	Humanities selection	3
Sp.Com. 200, Effective Speech	3		<hr/> 13
	<hr/> 13		
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Ch.E. 802, Chemical Technology	3	Ch.E. 803, Chemical Technology	3
Chem. 34, Organic Chemistry	3	Ch.E. 820, Chemical Technology Laboratory	4
Phys. 151, Technical Physics	3	Technical selection	3
Social science selection	3		<hr/> 10
	<hr/> 12		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.



## COMMUNITY SERVICES

The Community Services major is designed to provide entry-level professional competency in one of several human service fields. The objective of the Administration of Justice emphasis is to provide a general education background, a knowledge base in human development, and a core of professional skills.

The Administration of Justice emphasis educates and upgrades career personnel in police departments, probation and parole agencies, and correctional institutions. Challenges and problems in law enforcement, current approaches and alternatives for crime control, prevention, and rehabilitation are studied. The program includes one term of field experience in a local community agency.

### *The Administration of Justice Emphasis*

I. General Education Requirements (21 credits)	<i>Credits</i>
A. Communication skills	
Engl. 10, 20; Sp.Com. 200	9
B. Biological and physical sciences	
A minimum of 3 credits in each area	6
C. Arts and humanities	3
D. Social and behavioral sciences	3
II. Requirements for the Major (41 credits)	
A. General requirements	
Com.D. 7, H.Dev. 100, I.F.S. 129	7
B. Requirements for Administration of Justice emphasis	34
H.Dev. 321 (12)*, or Adm.J. 321 (8) plus 4 additional credits of approved professional electives; Adm.J. 111 and 221, plus 16 credits of professional electives with consent of adviser.	

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\*Guidelines for Field Placement include:

1. Agencies utilized are local agencies.
2. Priority for placement is made for students with higher term standings.
3. Prerequisites for placement include Com.D. 7 and Adm.J. 111.

COMPUTER SCIENCE

The primary objective of this program is to prepare graduates for immediate and continuing employability as application programmers, associate systems designers, or associate systems programmers.

To meet this objective the program is designed to ensure a thorough knowledge of the techniques of programming general-purpose digital computers, and includes extensive practice — using contemporary programming technologies — in the analysis, organization, validation, and documentation of effective computer code. The program also includes practical knowledge of the logical organization of modern digital computers and related peripheral equipment, the structure of operating systems and compilers, and considerations in the design of information systems.

The General Education Requirements provide the student with an extension to his basic educational foundation. The Requirements for the Major give the graduate technical competence in the computing and data processing field. The Application Specialization provides a practical knowledge of a minor or an application field within which the graduate may profitably utilize the acquired computing talent.

		<i>Scheduling Recommendation by Term Standing</i>	
		1-3	4-6
I. General Education Requirements (29 credits)			
A. Communication skills (9 credits)			
English selections (6)		x	—
Sp.Com. 200 (3)		—	x
B. Mathematics and statistics (12 credits)			
Math. 17 (3), 18 (3)		x	—
Mathematics selection (3)		x	—
Quantitative business analysis or statistics selection (3)		—	x
C. Social science, arts, humanities (6 credits)			
Social science selection (3)		x	x
Arts and humanities selection (3)		x	x
D. Physical education (2 credits)			
Physical education selections		x	—
II. Requirements for the Major (34 credits)			
A. General (22)			
Cmp.Sc. 101, 102, 140 (9)		x	—
Cmp.Sc. 804 (1)		x	—
Cmp.Sc. 44, 54, 64 (9)		—	x
Cmp.Sc. 805 (3)		—	x
B. Application Specialization (12 credits)			
Related course work in an area of computer application— to be approved by the student's adviser. These courses may be chosen from areas such as accounting, retail operations, general business, mathematics, general science, environmental resources, etc., and are selected from the courses offered at the student's campus.		x	x

## ASSOCIATE DEGREE MAJORS

### ELECTRICAL ENGINEERING TECHNOLOGY

This major is designed to prepare graduates for technological service with electrical utilities, manufacturers of electrical and electronic equipment, and electrical maintenance and instrument departments of various industrial concerns. The principal objective is to provide a practical knowledge of electrical machinery and its control, as well as of electronic theory and its application in communication and control systems.

FIRST TERM		SECOND TERM	
E.G. 1, Engineering Drawing	Credits 2	E.E. 801, Fundamentals of D.C. Circuits	Credits 3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		
	<hr/> 12		<hr/> 11
THIRD TERM		Credits	
Cmp.Sc. 1, Basic Computer Programming	1		
E.E. 814, Electrical Circuits	4		
E.E. 818, Electrical Circuits Laboratory	1		
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3		
Math. 803, Technical Calculus	3		
	<hr/> 12		
SUMMER TERM		Credits	
E.E. 813, Fundamentals of Electrical Machines	3		
FOURTH TERM		Credits	
		E.E. 804, A.C. Circuits	2
		E.E. 807, A.C. and Electronics Laboratory	2
		E.E. 810, Fundamentals of Semiconductors	3
		E.Mch. 810, Basic Mechanics	2
		Social science selection	3
			<hr/> 12
FIFTH TERM		Credits	
E.E. 815, A.C. Machinery and Control	4	SIXTH TERM	Credits
E.E. 816, Linear Electronic Circuits	3	E.E. 817, Advanced Electronics	4
E.E. 819, A.C. Machinery Laboratory	1	E.E. 820, Advanced Electronics Laboratory	2
E.E. 821, Linear Electronics Laboratory	1	Humanities selection	3
Sp. Com. 200, Effective Speech	3	Technical selection	2-3
	<hr/> 12		<hr/> 11-12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## FOREST TECHNOLOGY

The objectives of this major are to train students in the techniques that are basic to planning, organizing, directing, and managing forestry enterprises and to provide a program of general studies which will serve as a foundation for future intellectual growth. It is intended that graduates will act in a supporting capacity to professional foresters.

To be eligible to receive the degree of Associate in Forest Technology, a student must have completed the prescribed major of 69 credits.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
*Engl. 10, Composition and Rhetoric I; or Engl. 4, Basic Writing Skills	3	For. 800, Introduction to Forestry	1
For. 800, Introduction to Forestry	1	For. 803, Dendrology	1
For. 802, Dendrology	2	For. 806, Forest Inventories	3
For. 804, Forest Mensuration	3	For. 815, Forest Surveying I	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	<hr/>		<hr/>
	12		11

THIRD TERM	<i>Credits</i>
For. 800, Introduction to Forestry	1
For. 808, Forest Protection	3
Humanities selection	3
Acctg. 16, Introductory Accounting Survey	3
For. 816, Forest Surveying II	3
	<hr/>
	13

SUMMER TERM	<i>Credits</i>
For. 813, Summer Field Practice	4

FOURTH TERM	<i>Credits</i>
Engl. 826, Report Writing	3
For. 807, Forest Recreation	3
For. 812, Elements of Project Supervision in Forestry	3
For. 814, Forestry Leadership Practicum	1
	<hr/>
	10

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
For. 811, Forest Photo Interpretation	4	For. 809, Forest Valuation	3
Sp.Com. 200, Effective Speech	3	For. 810, Forest Improvements	3
Social science selection	3	For. 817, Urban Forestry	3
	<hr/>		<hr/>
	10		9

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10.



## ASSOCIATE DEGREE MAJORS

### HIGHWAY ENGINEERING TECHNOLOGY

This major prepares highway construction technicians to perform many of the planning and design tasks necessary in the construction of highways, railroads, bridges, viaducts, and airfields. In the planning stages of construction a highway construction technician may be engaged in estimating costs, purchasing materials, preparing specifications, computing fills, cuts, drainage requirements, drafting, designing, or surveying. During actual construction, such technicians may perform supervisory functions and inspection.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	E.Mch. 810, Basic Mechanics	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 150, Technical Physics	3
	<hr/> 12		<hr/> 13
 THIRD TERM	 <i>Credits</i>	 FOURTH TERM	 <i>Credits</i>
C.E. 812, Curves and Earthwork	3	C.E. 814, Photogrammetry	3
Cmp.Sc. 1, Basic Computer Programming	1	C.E. 818, Route Surveying	2
E.Mch. 813, Strength and Properties of Materials	3	*Engl. 826, Report Writing	3
Math. 803, Technical Calculus	3	Geosc. 1, Physical Geology	3
Phys. 151, Technical Physics	3		<hr/> 11
	<hr/> 13		
 FIFTH TERM	 <i>Credits</i>	 SIXTH TERM	 <i>Credits</i>
C.E. 821, Concrete Technology	3	C.E. 824, Asphalt Technology	3
C.E. 822, Soil Mechanics	3	C.E. 825, Construction Estimating	3
C.E. 823, Highway Organization and Operations	3	Econ. 14, Principles of Economics	3
Human. 1, Values of the Western Cultural Heritage	3	Sp.Com. 200, Effective Speech	3
	<hr/> 12		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

## HOTEL AND FOOD SERVICE

This is an intensive six-term major designed to prepare students for responsible executive positions in the hospitality industry and in health facilities food service administration. The emphasis in Health Facilities Food Service Administration qualifies students as dietetic technicians. The course of study places heavy reliance on experience acquired in an on-the-job setting. Students who achieve outstanding records may, upon completing this program, apply for admission to the baccalaureate degree program in Food Service and Housing Administration in the College of Human Development. Nine additional terms of satisfactory work are required to earn the baccalaureate degree.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	
6 credits in English, Sp.Com. 200	9
B. Arts, humanities, social and behavioral sciences	12
At least 3 credits in economics	
C. Physical education	2
II. Requirements for the Major	
A. General	15
F.S.H.A. 50, 225; H.F.S. 850, 860; 3 credits in accounting	
B. Specialization	30
Students may select an emphasis in Hospitality Administration or Health Facilities Food Service Administration.	
Students emphasizing Hospitality Administration will be required to take F.S.H.A. 102, H.F.S. 804 and 870, plus 20 additional credits with the approval of their adviser. Students emphasizing Health Facilities Food Service Administration will be required to take F.S.H.A. 103, H.F.S. 875, Nutr. 351 and 800, plus 16 additional credits with the approval of their adviser.	

## ASSOCIATE DEGREE MAJORS

### LABOR STUDIES

The purpose of this program is to help employees improve their understanding and competence in coping with personal, group, and organizational problems at their worksites, in relationships with employers, and in transactions with the community, the economy, and the polity. The program consists of a core of labor courses supplemented by introductory liberal arts studies which provide (1) basic communication skills, (2) conceptual tools of analysis, and (3) a more general cultural context for the examination of labor problems.

This major leads to the degree of Associate in Labor Studies.

I. General Education Requirements (21 credits)	<i>Credits</i>
A. Communication skills	
English selection, speech communication selection	6
B. Humanities, natural, and social sciences	15
Biological science, humanities, mathematics, physical science, and social science selections	
II. Requirements for the Major	
A. General	
Econ. 14, Hist. 21, Pl.Sc. 1, Psy. 2, Soc. 1	15
Management selection, speech selection	6
B. Labor Studies	18
L.S. 100*, 102, 103, 104, 156, 296	
	<hr/>
	60

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\*Will be accepted toward the baccalaureate major in Labor Studies.

**LETTERS, ARTS, AND SCIENCES\***

The objectives of this program are to broaden the student's understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student's interests or career plans. This program is a complete two-year degree program. However, graduates who later seek admission to baccalaureate programs may apply baccalaureate credits toward the new degree. Any 800-level credits taken in the Letters, Arts, and Sciences program are not applicable toward a baccalaureate degree.

This major leads to the degree of Associate in Letters, Arts, and Sciences.

	<i>Scheduling Recommendation by Term Standing</i>	
	1-3	4-6
I. Required Courses (36 credits)		
Communication skills (9 credits)		
+Engl. 10 (3), Engl. 20 (3)	x	—
Sp.Com. 200 (3)	x	—
Arts (6 credits)		
**Select 6 credits in any courses designated as arts	x	x
Humanities (6 credits)		
**Select 6 credits in any courses designated as humanities	x	x
Social and behavioral sciences (6 credits)		
**Select 6 credits in any courses designated as social and behavioral sciences	x	x
Science (6 credits)		
**Select 6 credits in any courses designated physical, biological, or earth and space sciences	x	x
Mathematics (3 credits)		
**Select 3 credits in mathematics (Math. 4, 6, 10 <i>not</i> acceptable), statistics, computer science, or philosophy (Phil. 12, 212 <i>only</i> )	x	x
II. Related Courses (9 credits)		
**Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, science and mathematics, and foreign language skills	x	x
III. Electives (15 credits)	x	x

\*The 45 required and related credits must be baccalaureate-level courses. For those intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a Bachelor of Arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken.

+Students will be placed in Engl. 4, Engl. 10, or Engl. 30 on the basis of English Placement Test scores. If a student is placed in Engl. 30, successful completion of that course will satisfy the English requirement; in addition, 3 credits will be given for Engl. 10.

\*\*Courses which will satisfy the arts, humanities, social and behavioral sciences, and science and mathematics requirements are defined in the University-wide requirements for a Bachelor of Arts degree described in the *Baccalaureate Degree Programs* catalog. Please note that subject areas which are listed as acceptable under more than one category may be applied to *only one* category.



## ASSOCIATE DEGREE MAJORS

### MASS COMMUNICATIONS—ADVERTISING

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to advertising. At the present time this major is not being offered.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Engl. 4, Basic Writing Skills	3	Engl. 10, Composition and Rhetoric I	3
Journ. 800, History and Survey of Mass Communications	3	Journ. 811, Advertising Copywriting	3
So.St. 800, Human Cultures and the Individual	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	<hr/> 10		<hr/> 12

THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Human. 800, Sources of Morality	3	Arts I, The Arts	3
Journ. 812, Advertising Layout	3	Journ. 813, Advertising Media and Campaigns	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	<hr/> 10		<hr/> 10

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Human. 1, Values of the Western Cultural Heritage	3	Music 5, The Fundamentals of Music Appreciation	3
Journ. 814, Newspaper Advertising	3	Journ. 820, Newspaper Management	3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	<hr/> 10		<hr/> 12

## MASS COMMUNICATIONS—BROADCASTING

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to broadcasting. A total of 61-63 credits are required for graduation.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Engl. 4, Basic Writing Skills; or		Engl. 10, Composition and Rhetoric	
Engl. 10, Composition and		I; or Engl. 20, Composition and	
Rhetoric I	3	Rhetoric II	3
Journ. 200, Mass Media and Society	3	Math. 800, Business Mathematics	3
Sp.Com. 801, Survey of Broadcasting	3	Sp.Com. 802, Radio and	
	—	Television Announcing	3
	9		—
			9
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Sp.Com. 803, Basic Writing for		Human. 101, Modern Science and	
Radio and Television	3	Human Values	3
*Humanities selection	3	Sp.Com. 804, Radio Programming,	
*Physical or biological science		Production, and Performance	3
selection	3	Sp.Com. 200, Effective Speech	3
	—	*Arts selection	3
	9		—
			12
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Sp.Com. 280, Oral Interpretation	3	Music 5, Fundamentals of	
Sp. Com. 805, Television Programming,		Music Appreciation	3
Production, and Performance	3	Sp. Com. 830, Directed Studies	1-3
*Social science selection	3	Thea. 109, The Dramatic Arts in	
Elective	3	the Mass Media	3
	—	Elective	3
	12		—
			10-12

\*To be selected with the approval of the program coordinator or adviser.

MASS COMMUNICATIONS—JOURNALISM

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to journalism.

FIRST TERM	Credits	SECOND TERM	Credits
Engl. 4, Basic Writing Skills	3	Engl. 10, Composition and Rhetoric I	3
Journ. 800, History and Survey of Mass Communications	3	Journ. 801, Beginning News Writing	3
So.St. 800, Human Cultures and the Individual	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	<hr/>		<hr/>
	10		12

THIRD TERM	Credits	FOURTH TERM	Credits
Human. 800, Sources of Morality	3	Arts 1, The Arts	3
Journ. 802, Beginning Reporting	3	Journ. 803, Fundamentals of Editing	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	<hr/>		<hr/>
	10		10

FIFTH TERM	Credits	SIXTH TERM	Credits
Human. 1, Values of the Western Cultural Heritage	3	Music 5, The Fundamentals of Music Appreciation	3
Journ. 804, Reporting the Community	3	Journ. 820, Newspaper Management	3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	<hr/>		<hr/>
	10		12

## MECHANICAL ENGINEERING TECHNOLOGY (DRAFTING AND DESIGN TECHNOLOGY)

This major is intended to prepare detail or layout draftsmen and junior designers for manufacturing industries as well as for the many concerns engaged in installation or erection work. The principal objective is to prepare young men and women for employment in machine design, tool and die design, or structural layout.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.G. 12, Spatial Analysis	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		
	<hr/> 12		<hr/> 11
THIRD TERM	<i>Credits</i>		
Cmp.Sc. 101, Introduction to Algorithmic Processes	3		
E.Mch. 811, Elementary Mechanics	3		
I.E. 811, Manufacturing Materials and Processes	3		
Math. 803, Technical Calculus	3		
	<hr/> 12		
+SUMMER TERM	<i>Credits</i>		
I.E. 812, Manufacturing Processes	3		
		FOURTH TERM	<i>Credits</i>
		E.G. 803, Advanced Engineering Drawing	3
		E.Mch. 813, Strength and Properties of Materials	3
		I.E. 315, Industrial Organization and Administration	3
		Sp.Com. 200, Effective Speech	3
			<hr/> 12
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
I.E. 815, Production Design	3	A.E. 809, Structure Design	3
M.E. 805, Kinematics	3	M.E. 810, Product Design	3
Social science selection	3	Humanities selection	3
Technical selection	2-3	Technical selection	3
	<hr/> 11-12		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

\*Summer term to be taken at the University Park Campus.



## MEDICAL LABORATORY TECHNOLOGY

This two-year program (eight terms) is designed to provide the necessary general and technical training for hospital personnel between the level of the Certified Laboratory Assistant and the Medical Technologist. The program includes one full year of intensive clinical experience at an affiliated hospital and the theoretical background necessary for the clinical procedures performed by the registered Medical Laboratory Technician. The program is a two-year program starting in the summer term. A total of 71-72 credits are required for graduation.

I. General Education Requirements (39-40 credits)

Communications (6 credits)

Engl. 10 (3)

Sp.Com. 200 (3)

Quantification (4 credits)

Math 4, 5, or 10 (3)

Cmp.Sc. 1 (1)

Natural Science (20-21 credits)

Biol. 29 (4)

Biol. 41 (3)

Biol. 42 (1)

Chem. 12 (3-4)

Chem. 14 (1)

Chem. 34 (3)

Micrb. 1 (3)

Micrb. 2 (2)

Arts and Humanities (3 credits)

Selection (3)

Social and Behavioral Sciences (6 credits)

Selection (6)

II. \*Requirements for the Major (32 credits)

Bioch. 100 (8)

Micrb. 101 (8)

Micrb. 102 (8)

Micrb. 801 (8)

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\*Medical Laboratory Technician clinical experience (32 credits). Affiliation now exists with St. Joseph Hospital, Hazleton, Pennsylvania.

# MINING TECHNOLOGY

A student in mining technology receives a blend of basic sciences, mathematics, communications, humanities and social sciences, and applied courses during the period of study. These courses are sequenced so that basic principles of physical processes are used to understand the specific procedures involved in mining. The curriculum covers a complete spread of material at a level consistent with potential careers of mining technology graduates.

This major prepares students for career positions of a management-oriented or an engineering-oriented nature in the mining industry. Two options, selected at the beginning of the second year, provide a choice between production work and maintenance work. Many of the graduates of this program, after serving the necessary apprenticeship, become certified managers in their fields.

The Maintenance Option prepares a student to become a maintenance supervisor. Initially, the graduate would work as an apprentice electrician or mechanic and would gain experience in repairs and in planned maintenance. Once certification is obtained, it is expected that the graduate would become involved with maintenance planning, working as or with the chief mine mechanic or chief mine electrician.

The Production Option prepares a student to become a mine foreman or an engineering aide. Initially, some of the assigned duties are to run transit and act as survey party chief, keep mine maps up-to-date and make projections, take samples and run analyses, make time studies, and assist with materials handling layouts.

## MAINTENANCE OPTION

FIRST TERM	Credits	SECOND TERM	Credits
Econ. 14, Principles of Economics	3	Cmp.Sc. 1, Basic Computer Programming	1
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
Math. 801, Technical Mathematics	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Mng.T. 800, Mining Technology Orientation	1	Math. 802, Technical Mathematics	3
	—	Phys. 150, Technical Physics	3
	10		—
			12
THIRD TERM	Credits	FOURTH TERM	Credits
Chem. 11, Introductory Chemistry	3	Mng.T. 807, Electrical Mine Machine Circuits	3
E.Mch. 811, Elementary Mechanics	3	Mng.T. 810, Mine Machine Dynamics	3
Mng.T. 804, Mine Plant Technology	3	Humanities selection	3
Sp.Com. 200, Effective Speech	3	Social science selection	3
	—		—
	12		12
FIFTH TERM	Credits	SIXTH TERM	Credit
Mng.T. 801, Coal Mining Technology	3	Engl. 826, Report Writing	3
Mng.T. 802, Mine Ventilation	3	Mng.T. 809, Mine Machinery Hydraulics	3
Mng.T. 808, Mine Power Distribution	3	Mgmt. 800, Principles of Management	3
Mng.T. 806, Mine Management and Law	3	Mng.T. 811, Practicum in Mine Maintenance	3
	—		—
	12		12

ASSOCIATE DEGREE MAJORS

PRODUCTION OPTION

FIRST TERM		SECOND TERM	
Econ. 14, Principles of Economics	Credits 3	Cmp.Sc. 1, Basic Computer Programming	Credits 1
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
Math. 801, Technical Mathematics	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Mng.T. 800, Mining Technology Orientation	1	Math 802, Technical Mathematics	3
	10	Phys. 150, Technical Physics	3
			12
THIRD TERM		FOURTH TERM	
Chem. 11, Introductory Chemistry	Credits 3	Geosc. 1, Physical Geology; or Geosc. 20, Our Earth	Credits 3
E.Mch. 811, Elementary Mechanics	3	Mn.Pr. 61, Introduction to Coal Preparation	3
Mng.T. 804, Mine Plant Technology	3	Humanities selection	3
Sp.Com. 200, Effective Speech	3	Social science selection	3
	12		12
FIFTH TERM		SIXTH TERM	
Mng.T. 801, Coal Mining Technology	Credits 3	Engl. 826, Report Writing	Credits 3
Mng.T. 802, Mine Ventilation	3	Mng.T. 803, Strata Control	3
Mng. 30, Introduction to Mining Engineering	3	Mng.T. 805, Mine Systems Technology	3
Mng. 806, Mine Management and Law	3	Mng. 23, Mineral Land and Mine Surveying	3
	12		12

## NUCLEAR ENGINEERING TECHNOLOGY

This major is designed to provide technically trained personnel to support the rapidly developing nuclear industry between the levels of high school graduate and professional engineer. The wide scope of training prepares the nuclear technician to assist the professional engineer in research, development, testing, manufacture, and maintenance through a career in radiation safety, reactor operations, radioisotope handling, nuclear and control instrumentation, fuel fabrication, and health physics.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 801, Fundamentals of D.C. Circuits	3
Engr. 2, Engineering Orientation	1	E.E. 809, D.C. Circuits Laboratory	2
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	<hr/> 12		<hr/> 12
THIRD TERM	Credits	FOURTH TERM	Credits
Chem. 11, Introductory Chemistry	3	Nuc.E. 800, Nuclear and Atomic Science	2
E.E. 814, Electrical Circuits	4	Nuc.E. 805, Principles of Measurement	3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3	Social science selection	3
Math 803, Technical Calculus	3	Sp. Com. 200, Effective Speech	3
	<hr/> 13		<hr/> 11
FIFTH TERM	Credits	+SIXTH TERM	Credits
*Engl. 826, Report Writing	3	Nuc.E. 803, Elements of Nuclear Power Generation	3
M.E. 807, Heat Transfer	3	Nuc.E. 804, Introduction to Reactor Technology	3
Nuc.E. 801, Radiological Safety	2	Nuc.E. 812, Nuclear Technology Laboratory	3
Nuc.E. 802, Elements of Nuclear Technology	2	Nuc.E. 814, Reactor Technology Laboratory	3
Humanities selection	3		<hr/> 3
	<hr/> 13		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

+Sixth term is to be taken at the University Park Campus.



## ASSOCIATE DEGREE MAJORS

### NURSING

This major prepares graduates to practice technical nursing in hospitals or similar health care organizations. After earning the degree of Associate in Nursing, students may write the State Board Test Pool Examination for licensure as registered nurses.

Clinical nursing courses are systematically integrated into the associate degree nursing program. The clinical facilities of Hamot Medical Center and other health care institutions in the metropolitan Erie area are utilized. A total of 77 credits are required for graduation.

Students are responsible for arranging transportation to clinical facilities.

FIRST TERM	Credits	SECOND TERM	Credits
Biol. 29, Mammalian Anatomy	4	Biol. 41, Physiology	3
Psy. 2, Psychology	3	Micrb. 6, Elementary Microbiology	2
Nurs. 800, Foundations of Technical Nursing I	6	Micrb. 7, Elementary Microbiology Laboratory	1
	13	Nurs. 801, Foundations of Technical Nursing II	6
			12
THIRD TERM	Credits	FOURTH TERM	Credits
*Engl. 10, Composition and Rhetoric I; or Engl. 4, Basic Writing Skills	3	Nurs. 802, Techniques of Nursing in Childhood	7
+Psy. 13, Introduction to Developmental Psychology	3	Sp.Com. 200, Effective Speech	3
Nurs. 805, Techniques of Nursing the Patient in Senescence	7	‡Nurs. 806, Nursing Seminar	3
	13		13
FIFTH TERM	Credits	SIXTH TERM	Credits
Nurs. 803, Techniques of Nursing the Mature Patient	7	Nurs. 804, Techniques of Nursing the Patient in the Middle Years	7
**Selections	6	**Selections	6
	13		13

\*Students will be placed in Engl. 4 or Engl. 10 on the basis of the English Placement Test scores.

+Psy. 13 must be completed by the end of the third term.

\*\*Three credits must be in arts and humanities. It is recommended that 3 credits be in Chem. 11 if the student has not completed a high school chemistry course and that the remaining credits be taken in the areas of anthropology, chemistry, English, individual and family studies, nutrition, physics, psychology, or sociology.

‡Nurs. 806 may be taken only after completion of the first year of the program.

## RECREATION AND PARKS

Graduates of this major, which prepares students to assume leadership roles with recreation program participants, may organize and lead recreation activities in program areas such as sports, performing arts, or nature and camping. The graduate may supervise such facilities as community centers, parks, special sports centers, and nature centers in a variety of settings, e.g., municipal recreation and park departments, youth-serving agencies, hospitals, schools, nursing homes, and private or commercial agencies. A total of 64 credits are required for the associate degree.

### RECREATION LEADERSHIP OPTION

I. General Education (38 credits)	<i>Credits</i> 9
A. Communication skills	
Engl. 4 or 10 (3)	
Engl. 10 or 20 (3)	
Sp.Com. 200 (3)	
B. Science	6
6 credits selected from: Biol. 11; Bi.Sc. 1, 3, 4; Chem. 11;	
Geosc. 20; Math. 800; Ph.Sc. 7	
C. Arts and humanities	9
A.Ed. 14 (3)	
Thea. 104 (3)	
Thea. 806 (3)	
D. Social and behavioral sciences	6
Psy. 2 or 37 (3)	
Soc. 1 or 5 (3)	
E. Health and physical education	8
Hl.Ed. 303 (2)	
Ph.Ed. 5 (3)	
Team sports	
Lifetime sports	
Swimming	
Ph.Ed. 803, Games for Children (1)	
Ph.Ed. 804, Dance and Gymnastics (1)	
Ph.Ed. 807, Adapted Activities (1)	
II. Requirements for the Major (20-21 credits)	20-21
Rc.Pk. 120, Man and Leisure (3)	
Rc.Pk. 130, Outdoor Living Skills (1)	
Rc.Pk. 150, The Scope of Recreation and Parks Services (1)	
Rc.Pk. 190, The Role of the Recreation and Parks Professional (1)	
Rc.Pk. 230, Camp Counseling (2); or Rc.Pk. 877, Therapeutic Recreation Program (3)	
Rc.Pk. 236, Theory and Practice of Recreation Leadership (3)	
Rc.Pk. 850, Field Practicum (3)	
Rc.Pk. 856, Recreation Program Planning (3)	
Rc.Pk. 875, Introduction to Therapeutic Recreation (3)	
III. Electives (5-6 credits)	5-6

ASSOCIATE DEGREE MAJORS

RETAILING

This major, which trains for positions in retail stores, provides a minimum foundation of a general education, a basis for understanding customer wants and needs, and a technical knowledge of retail procedures. It includes one term of supervised store experience. The major constitutes a well-balanced program for individual growth and development as well as for specialized employment training.

I. General Education Requirements (21 credits)	<i>Credits</i>
A. Communication skills	
6 credits in English, Sp.Com. 200	9
B. Biological and physical sciences	
A minimum of 3 credits in each area	6
C. Arts and humanities	
3 credits from either area	3
D. Social and behavioral sciences	
Selected with adviser's approval	3
II. Requirements for the Major (45 credits)	
A. Courses in retailing	
Mktg. 804, 805, 806; H.Dev. 321; M.E.R. 213; 214, 301; Rtl. 840, 850	29
B. Courses in individual development	
I.F.S. 16 (1) plus adviser's recommendations for other college courses	7
C. Professional selections	
Selected with adviser's approval	9

## SCIENCE

This major is primarily designed to provide for the basic educational needs of students who desire to pursue professional programs as outlined by medical accrediting societies. The program provides a fundamental group of science courses of value to those who seek positions in government or industry where such knowledge is necessary or desirable. For graduation, 64 credits are required.

		<i>Scheduling Recommendation by Term Standing</i>	
		1-3	4-6
I. Required Courses: 52 credits			
A. Communication skills (6 credits)			
Engl. 10 (3)		x	—
Sp.Com. 200 (3)		—	x
B. Social and behavioral sciences (6 credits)		x	x
C. Arts and humanities (6 credits)			
Human. 101 (3)		—	x
Selection (3)		—	x
D. Quantification (9 credits)			
Math. 10 (3), 20 (3)		x	—
Cmp.Sc. 101 (3)		—	x
E. Natural sciences (25 credits)			
Biol. 11 (3), 29 (4), Chem. 11 (3), Phys. 150 (3)		x	—
Biol. 41 (3), Micrb. 6 (2), Micrb. 7 (1), Phys. 151 (3)		—	x
Chem. 34 (3) or Bioch. 1 (3)		—	x
II. Related Courses: 12 credits			
Select 12 credits from the following biological, mathematical, and physical science courses:		x	x
Biol. 12 (3), 13 (3), 33 (3), 42 (1), Bi.Sc. 3 (3), Chem. 35 (3), 102 (3), Astro 1 (3), Stat. 200 (4), Math. 21 (3), Phil. 212 (3), Phys. 297 (3)			



ASSOCIATE DEGREE MAJORS

**SCIENCE**  
**RADIOLOGIC TECHNOLOGIST RADIOGRAPHER OPTION**

This option is a two-year program and requires eight terms to complete. For graduation, 65 credits are required.

		<i>Scheduling Recommendation by Term Standing</i>		
		1-3	4-6	7-8
I.	Required Courses: 52 credits			
A.	Communication skills (6 credits)			
	Engl. 10 (3)	x	—	—
	Sp.Com. 200 (3)	—	x	—
B.	Social and behavioral sciences (6 credits)	x	x	—
C.	Arts and humanities (6 credits)			
	Human. 101 (3)	—	x	—
	Selection (3)	—	x	—
D.	Quantification (9 credits)			
	Math. 10 (3), 20 (3)	x	—	—
	Cmp.Sc. 101 (3)	—	x	—
E.	Natural sciences (25 credits)			
	Biol. 11 (3), 29 (4), Chem. 11 (3), Phys. 150 (3)	x	—	—
	Biol. 33 (3), 41 (3), Phys. 151 (3), 297 (3)	—	x	—
II.	Related Courses (13 credits)			
	R.T.R. 1 (1), 20 (1), 30 (1)	x	—	—
	R.T.R. 40 (5), 50 (1), 60 (1)	—	x	—
	R.T.R. 70 (1), 80 (1), 90 (1)	—	—	x

## SOCIOLOGY

This major introduces to students the study of human groups and their relationships to each other and to the environment; it enables students to gain some proficiency in the scientific study of group structures and processes. A further objective is to help students become more skillful in working with community institutions, agencies, and organizations either through gainful employment or as a volunteer.

I. General Education (33 credits)	<i>Credits</i>
A. Speaking and writing skills	9
Engl. 10 and 20 (6)	
Sp.Com. 200 (3)	
B. Mathematics	3
Math 4, 6, and 10 are not acceptable	
C. Science	6
Three credits in each of two groups listed below:	
a. Chemistry, physical science, physics	
b. Biological science, biology, botany, psychology, zoology	
c. Astronomy, biochemistry, genetics, geological science, meteorology, microbiology, physical geography	
d. Computer science, statistics, symbolic logic (Phil. 12 or 212 only)	
D. Arts	3
E. Humanities	6
F. Social and behavioral sciences	6
(Not to include sociology)	
II. Requirements for the Major (18 credits)	18
Soc 1 (3)	
Soc. 3 or 5 (3)	
Soc. 7 (3)	
*Additional credits in sociology (9)	
III. +Electives (9 credits)	9

Total minimum credits required for the associate degree: 60

\*Selected in consultation with the student's adviser to reflect the student's career and/or basic interests.

+For students planning to transfer to the B.A. program in either sociology or social welfare, one college-level course in a foreign language must be passed with at least a grade of C. It is also recommended that University Baccalaureate Degree Requirements be considered in so far as practical.

ASSOCIATE DEGREE MAJORS

SOLAR HEATING AND COOLING TECHNOLOGY

A total of 72 credits are required for graduation.

FIRST TERM		SECOND TERM	
A.E. 801, Building Materials	Credits 3	A.E. 802, Methods of Construction	Credits 3
E.G. 3, Architectural Graphics	2	E.Mch. 811, Elementary Mechanics	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 150, Technical Physics	3
S.T. 801, Introduction to Solar Technology	2		
	13		12
THIRD TERM		FOURTH TERM	
E.Mch. 813, Strength and Properties of Materials	Credits 3	A.E. 803, Plumbing and Fire Protection	Credits 3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3	Cmp.Sc. 101, Introduction to Algorithmic Processes	3
Math. 803, Technical Calculus	3	M.E. 881, Elementary Thermo and Fluid Dynamics	2
Phys. 151, Technical Physics	3	Sp.Com. 200, Effective Speech	3
	12		11
FIFTH TERM		SIXTH TERM	
A.E. 809, Structure Design	Credits 3	A.E. 804, Heating, Ventilating, and Air Conditioning Layout	Credits 3
S.T. 802, Solar Collectors	3	S.T. 804, Analysis of Solar Heating and Cooling Systems	3
S.T. 803, Heat Storage and Distribution Systems	3	S.T. 805, Economics of Solar Technology Systems	3
Social science selection	3	Humanities selection	3
	12		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## STEEL TECHNOLOGY

This program prepares students for positions in the metallurgical and metals-oriented industries as technical personnel in research laboratories and in quality control, as supervisors of service groups, and as foremen of production operations.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3-4
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Chem. 14, Experimental Chemistry	1
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
Engr. 2, Engineering Orientation	1	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	<hr/> 12		<hr/>
			11-12
THIRD TERM	<i>Credits</i>		
Metal. 800, Metallurgical Laboratory Practice	4		
Metal. 804, Plant Trips; or Metal. 805, Metallurgical Operations	1		
Phys. 150, Technical Physics	3		
Social science selection	3		
	<hr/> 11		
SUMMER TERM	<i>Credits</i>		
Mat.T. 804, Summer Field Practice (4); or I.E. 812, Manufacturing Processes (3)	3-4		
		FOURTH TERM	<i>Credits</i>
		E.E. 800, Applied Electricity	2
		Geosc. 1, Physical Geology; or Geosc. 20, Our Earth	3
		Metal. 801, Ferrous Metallurgy	3
		Phys. 151, Technical Physics	3
			<hr/> 11
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Geog. 26, Human Geography; or Econ. 14, Principles of Economics	3	I.E. 809, Inspection and Quality Control	3
Humanities selection	3	Mat.T. 803, Materials Testing	4
Metal. 803, Nonferrous Metallurgy	3	Metal. 802, Physical Metallurgy	3
Sp.Com. 200, Effective Speech	3	Metal. 804, Plant Trips; or Metal. 805, Metallurgical Operations	1
	<hr/> 12		<hr/>
			11

\*Students will be placed in Engl. 4 or Engl. 10 on the basis of English Placement Test scores.



## ASSOCIATE DEGREE MAJORS

### SURVEYING TECHNOLOGY

The objectives of the major are to provide a knowledge of the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys, and to develop trained personnel who understand the relation between the precision of measurements and the interpretation of data in addition to having an appreciation of the skills and equipment needed to make precise measurements in the field of surveying.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	*Engl. 4, Basic Writing Skills;	
Engr. 2, Engineering Orientation	1	or Engl. 10, Composition and	
Math. 801, Technical Mathematics	3	Rhetoric I	3
Phys. 150, Technical Physics	3	Math. 802, Technical Mathematics	3
	<hr/>	Phys. 151, Technical Physics	3
	12		<hr/>
			11

THIRD TERM	<i>Credits</i>
C.E. 812, Curves and Earthwork	3
C.E. 818, Route Surveying	2
Cmp.Sc. 1, Basic Computer	
Programming	1
*Engl. 10, Composition and Rhetoric I;	
or Engl. 20, Composition and	
Rhetoric II	3
Math. 803, Technical Calculus	3
	<hr/>
	12

SUMMER TERM	<i>Credits</i>
C.E. 813, Practical Field Problems	4

FOURTH TERM	<i>Credits</i>
C.E. 816, Special Surveys	3
C.E. 817, Cartographic Techniques	2
E.G. 12, Spatial Analysis	2
E.Mch. 810, Basic Mechanics	2
Sp.Com. 200, Effective Speech	3
	<hr/>
	12

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
C.E. 810, Statistics and Least		C.E. 815, Geodetic Surveying	3
Squares	3	C.E. 890, Legal Aspects of	
C.E. 814, Photogrammetry	3	Surveying	2
*Engl. 826, Report Writing	3	Humanities selection	3
Pl.Sc. 1, American National		Technical selection	2-3
Government	3		<hr/>
	<hr/>		10-11
	12		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

## WILDLIFE TECHNOLOGY

This program will prepare a student in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and care, maintenance, and propagation of animals. They will support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 10, Introductory Engineering Graphics	1	C.E. 809, Topographic Drawing	2
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I; or Engl. 826, Report Writing	3
For. 802, Dendrology	3	Math. 801, Technical Mathematics I	3
Wildl. 801, Introduction to Wildlife Management	3	Wildl. 804, Wildlife Mensuration	3
	<hr/> 10		<hr/> 11
THIRD TERM	<i>Credits</i>		
Wildl. 803, Animal Identification	3		
Wildl. 812, Wildlife Field Surveys	3		
Wildl. 814, Habitat Management	3		
	<hr/> 9		
SUMMER TERM	<i>Credits</i>		
Wildl. 805, Field and Laboratory Techniques	3		
Wildl. 806, Operational Procedures and Equipment	2		
	<hr/> 5		
		FOURTH TERM	<i>Credits</i>
		Sp.Com. 200, Effective Speech	3
		For. 808, Forest Protection	3
		Wildl. 807, Outdoor Recreation	3
		Social science selection	3
			<hr/> 12
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
For. 812, Elements of Project Supervision in Forestry	3	Acctg. 816, Introductory Accounting Survey	3
Wildl. 809, Animal Care	3	Human. 801, Science, Technology, and Human Values	3
Wildl. 811, Aerial Photo Interpretation	4	Wildl. 813, Fisheries Management for Technicians	3
	<hr/> 10		<hr/> 9

## COURSE DESCRIPTIONS

### CREDITS AND HOURS

A credit requires three 75-minute periods per week of an average student's time. The distribution of that time between class activities (such as lecture, recitation, laboratory, field trips, etc.) and outside preparation varies from course to course.

Credits, classroom work, and laboratory work are indicated by three numbers in parentheses immediately following the course title.

1. The first number shows the maximum course credits and therefore the total time required by the course per week. For example, a 2-credit course normally requires 7½ hours per week for class activity and individual preparation.
2. The second number shows the periods of classroom work (a period is 75 minutes), including lecture, recitation, class discussion, demonstration, or various combinations of these.
3. The third number shows the periods of practicum room work (a period is 75 minutes), including laboratory, shop work, studio, drafting room, field trips, etc.

Courses numbered from 800 to 899 are reserved for the associate degree majors. Credit received for 800-series courses is not applicable to any baccalaureate degree program offered by the University with the exception of programs offered by Capitol Campus. Courses numbered from 1 to 399 carry baccalaureate credit and are required in most of the associate degree majors. Elective credit courses vary from campus to campus and term to term. Information regarding such offerings may be obtained from the *Schedule of Classes* for the various campuses.

### ACCOUNTING (ACCTG)

16. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Accounting for proprietorships, partnerships, and corporations for retailers and manufacturers; financial statement analysis. Students who have passed Acctg. 101 may not schedule this course.

101. INTRODUCTORY FINANCIAL ACCOUNTING (3:2:1½) Fundamentals of the collection, recording, summarization, and interpretation of accounting data.

102. INTRODUCTORY MANAGERIAL ACCOUNTING (3:2½:1) Actual and standard cost systems; managerial uses of cost data. Prerequisite: Acctg. 101.

801. INTRODUCTORY ACCOUNTING (3:2:1)

802. INTRODUCTORY ACCOUNTING (3:2:1) Prerequisite: Acctg. 801.

803. INTERMEDIATE ACCOUNTING (3:3:0) Financial accounting statements, concepts, and procedures; assets, liabilities, owners' equity, statement analysis. Prerequisite: Acctg. 802.

806. FEDERAL TAX ACCOUNTING (3:3:0) Federal tax revenue system as it affects the individual and business; tax planning, research and preparation of returns. Prerequisite: Acctg. 802.

807. MANAGERIAL ACCOUNTING (3:3:0) Cost and budgetary control; preparation of information for decision making. Prerequisite: Acctg. 802.

816. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Fundamentals of accumulation and summarization of accounting data; emphasis on financial statement analysis and the uses of accounting in business.

### ADMINISTRATION OF JUSTICE (ADM J)

7. INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0) An introduction to the study of community, community systems, and impact on the individual.

111. POLICE AND THE COURTS (3:3:0) Examines evolution, organization, operation of law enforcement agencies; justice process through conviction, law enforcement interface with other justice system elements.

## AEROSPACE ENGINEERING TECHNOLOGY

221. **CORRECTIONAL STRATEGIES (3:3:0)** Examination of the criminal justice system from sentencing through final discharge from correctional supervision, and relationship to pre-conviction system. Prerequisite: Adm.J. 111.
240. **RESEARCH STRATEGIES IN ADMINISTRATION OF JUSTICE (3:3:0)** A survey of the various research strategies relevant to the investigation of research questions in the administration of justice. Prerequisites: H.Dev. 200; Ed.Psy. 300 or Psy. 15 or Stat. 200.
321. **INITIAL FIELD PROJECT IN ADMINISTRATION OF JUSTICE (8:0:16)** Initial placement to be taken prior to seventh-term standing; may be placed in any type administration of justice agency. Prerequisites: Com.D. 7, Adm.J. 111, 221.

## AEROSPACE ENGINEERING TECHNOLOGY (AERSP)

800. **APPLIED AERODYNAMICS (3:3:0)** Fluid mechanics; characteristics of wings and airfoils, drag estimation, aircraft performance and static stability. Prerequisite: Phys. 151.
802. **AIRCRAFT STRUCTURAL ANALYSIS (3:3:0)** Truss analysis; shear flow; thin-webbed beams; box beams; semimonocoque structures; joints and fittings; members in tension and compression. Prerequisite: E.Mch. 813.
803. **TECHNICAL AERODYNAMICS (3:3:0)** Potential flow; airfoil theory, vortex systems, wing theory, viscous flow, boundary layers. Prerequisite: Aersp. 800.
804. **AIRCRAFT PROPULSION (3:3:0)** Piston and turbine engines; thermodynamics; propellers; compressor and turbine design; operating characteristics; chemical rockets. Prerequisite: Aersp. 803.
806. **COMPUTER APPLICATIONS TO AEROSPACE ENGINEERING (3:1:5)** Digital and analog computer programming, application to aircraft performance, stability and control, nonlinear and simultaneous differential equations. Prerequisite: Cmp.Sc. 1. Concurrent: Aersp. 800.
807. **AIRCRAFT STRUCTURAL DESIGN (3:1:4)** Aerodynamic and inertia loads; aircraft materials; fasteners; design of components; design layout. Prerequisites: Aersp. 802, 803.
808. **ELECTRONIC INSTRUMENTATION (3:1:5)** Electrical measurements, power supplies, amplifiers, oscillators, servo systems, operational amplifiers, switching and counting systems. Prerequisite: E.E. 800.
809. **AEROSPACE LABORATORY (2:1:3)** Velocity measurements; force measurements; subsonic wind tunnel testing; static and dynamic structural testing; flight testing. Prerequisite: Aersp. 800.
810. **PRINCIPLES OF FLIGHT (3:2:3)** Airplane principles, navigation, meteorology, F.A.A. regulations; airplane performance, flight experiments, flight instruction. Prerequisite: Aersp. 800.
830. **SELECTED TOPICS IN AEROSPACE ENGINEERING TECHNOLOGY (3)** Individual or group work in aerospace engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## AGRICULTURAL ECONOMICS (AG EC)

2. **MARKETING (3:3:0)** Development of methods and present status of marketing farm products; emphasis on assembling, grading, and standardization, packing, processing, transporting, storing, financing, and distributing.
6. **FARM MANAGEMENT (3:2:2)** Organizing and operating farm businesses for financial success; measuring profits; improving efficiency of labor, land, and capital; getting started in farming.
800. **THE AGRICULTURAL ECONOMY (3:3:0)** A survey of the agricultural economy; nature, scope and trends of ag-industry; and agriculture in the national perspective.
801. **MANAGEMENT OF COMMERCIAL FARMS (3:2:2)** Methods of analysis to determine farm organization, and profitability of alternate enterprises, capital investments, and use of production resources.



## **COURSE DESCRIPTIONS**

802. **AGRICULTURAL MARKETING AND SALES (3:3:0)** Marketing channels, services, costs, and price relationships involved in distributing farm supplies and agricultural products.

803. **INTRODUCTION TO AGRICULTURAL BUSINESS (3:3:0)** Economic principles which determine the supply, demand, and price of agricultural products and provide methodology for management decisions.

## **AGRICULTURAL ENGINEERING (AG E)**

800. **FARM POWER (2:1:2)** Principles and performance characteristics of tractors, electric motors, and other power units; application and maintenance of farm power equipment.

801. **FARM STRUCTURES AND UTILITIES (3:2:2)** Planning for efficient utilization of buildings, power, and equipment for materials handling and environmental control in agricultural production and processing.

## **ANIMAL INDUSTRY (A I)**

800. **LIVESTOCK PRODUCTION (2:1:2)** The livestock and meat industry in the United States; management of commercial beef, swine, and sheep enterprises.

## **ARCHITECTURAL ENGINEERING TECHNOLOGY (A E)**

801. **BUILDING MATERIALS (3:3:0)** Structural and architectural use of building materials and construction assemblies.

802. **METHODS OF CONSTRUCTION (3:1:5)** Materials and methods of construction used in buildings, as expressed in drawings. Prerequisites: A.E. 801, E.G. 3.

803. **PLUMBING AND FIRE PROTECTION (3:2:2)** Layout of plumbing and fire protection in buildings to meet code and usage requirements. Prerequisite or concurrent: A.E. 802.

804. **HEATING, VENTILATING AND AIR CONDITIONING LAYOUT (3:2:2)** Fundamental calculations and layout of systems in buildings. Prerequisite: A.E. 803.

805. **ARCHITECTURAL RENDERING (2:0:6)** Architectural rendering techniques, including use of shade and shadow; color. Prerequisite: E.G. 3.

807. **ADVANCED CONSTRUCTION METHODS (3:1:5)** Integration of materials and systems in working drawings. Prerequisite: sixth-term standing.

808. **GRAPHIC ANALYSIS (2:0:6)** Graphical analysis of force systems, centers of gravity, stresses in framed structures, arches, walls, moments and deflections of beams. Prerequisites: E.G. 12, E.Mch. 811.

809. **STRUCTURE DESIGN (3:1:5)** Elementary principles of structural design and detailing in timber, steel, and reinforced concrete; use of handbooks; fundamentals of structural and architectural drafting. Prerequisites: E.Mch. 813; A.E. 802 or E.G. 803.

810. **ARCHITECTURAL ENGINEERING OFFICE PRACTICE (3:3:0)** Procedures involved in production of contract documents, both drawings and specifications. Prerequisite: sixth-term standing.

812. **BUILDING LIGHTING AND ELECTRICAL LAYOUT (3:2:2)** Layout of lighting and electrical distribution in buildings.

814. **STEEL CONSTRUCTION (3:2:2)** Strength of materials as applied to the design of simple steel structures. Prerequisites: A.E. 802, E.Mch. 811.

815. **CONCRETE CONSTRUCTION (3:2:2)** Fundamentals of design and construction of reinforced concrete structures. Prerequisites: A.E. 802, E.Mch. 811.

830. **SELECTED TOPICS IN ARCHITECTURAL ENGINEERING TECHNOLOGY (3)** Individual or group work in architectural engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ART EDUCATION (A ED)

14. **INTRODUCTORY CRAFTS FOR TEACHERS (3:1:5)** Direct experience with materials such as wood, clay, metal, paper, textiles, and plastics in relationship to the creative needs of children.
806. **ARTS AND CRAFTS (3:1:5)** An introduction to arts and crafts processes, experiences, and materials appropriate for community centers, playgrounds, etc.; designed for recreation leadership.

## ART HISTORY (ART H)

100. **INTRODUCTION TO ART (3:3:0)** An approach to the understanding of art through a critical analysis of selected works of architecture, painting, and sculpture. Students who have passed Art H. 110 may not schedule this course.
110. **SURVEY OF WESTERN ART (3:3:0)** General survey of major developments in architecture, painting, and sculpture in the Western world. Students who have passed Art H. 100 may not schedule this course.
305. **MODERN PAINTING (3:3:0)** The development of painting from the French Revolution to the present.
307. **AMERICAN ART (3:3:0)** History of art in the English colonies and the United States from the seventeenth century to the present.

## THE ARTS (ARTS)

1. **THE ARTS (3:3:0)** Developing perception in the arts through relating the visual, musical, performing and environmental arts.

## ASTRONOMY (ASTRO)

1. **ASTRONOMICAL UNIVERSE (3:3:0)** Nonmathematical description of the astronomical universe and the development of scientific thought. For nonscience majors. Students who have passed Astro. 90 may not schedule this course.

## BIOCHEMISTRY (B CHEM)

100. **CLINICAL CHEMISTRY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15)** Theoretical and practical concepts associated with clinical chemistry testing procedures used in the diagnosis of human diseases. Prerequisite: Chem. 34.

## BIOLOGICAL SCIENCE (BI SC)

1. **STRUCTURE AND FUNCTION OF ORGANISMS (3:3:0)** Origin, development, and cellular basis of life; fundamental principles, processes and structures of organisms. Students who have passed Biol. 11, 12, 13, 27, or 41 may not schedule this course.
2. **EVOLUTIONARY RELATIONSHIPS OF ORGANISMS (3:3:0)** Examination of the biological world in terms of reproduction, genetics, evolution, development, diversity; interrelationships and interdependence of organisms, populations, communities. Students who have passed Biol. 11, 12, 13, 22, or 33 may not schedule this course.
3. **MAN AND HIS ENVIRONMENT (3:3:0)** Kinds of environments; past and present uses and abuses of natural resources; disposal of man's wastes; prospects for the future. Students who have passed Biol. 210 or any other upper-level ecology course in biology may not schedule this course.

## COURSE DESCRIPTIONS

4. **BIOLOGY OF MAN (3:3:0)** A general survey of structure and function in man—from conception, through growth and reproduction, to death. Students who have passed Biol. 29 and 41 may not schedule this course.

### BIOLOGY (BIOL)

11. **LIFE SCIENCE (3:2:2)** Structure, metabolism, development, reproduction, and evolution of plants and animals.

12. **BOTANY (3:2:2)** Structure, metabolism, development, reproduction, and evolution of plants with an introduction to the fields of anatomy, morphology, and physiology. Prerequisite: Biol. 11.

13. **ZOOLOGY (3:2:2)** Morphology, physiology, development, life history, and evolution of animals with a consideration of their importance to human welfare. Prerequisite: Biol. 11.

29. **MAMMALIAN ANATOMY (4:2:4)** Anatomy of a mammal, with special reference to that of man. Students who have passed Biol. 421 may not schedule this course.

33. **HUMAN GENETICS (3:3:0)** Human heredity and its individual and social implications. Students who have passed Biol. 22 may not schedule this course. Prerequisite: 3 credits in biological sciences.

41. **PHYSIOLOGY (3:3:0)** Normal functions of the animal body, with special reference to those of man. Students who have passed Biol. 472 may not schedule this course.

42. **PHYSIOLOGY LABORATORY (1:0:2)** Experiments demonstrating basic physiological principles with special reference to man. Prerequisite or concurrent: Biol. 41.

### BIOMEDICAL EQUIPMENT TECHNOLOGY (B E T)

801. **PHYSIOLOGICAL TRANSDUCERS (3:2:2)** Study of the principles of operation and applications of devices used for the conversion of physiological events to electrical signals. Concurrent: E.E. 816.

802. **BIOMEDICAL INSTRUMENTATION AND SYSTEMS (3:2:2)** Introduction to the operating principles, calibration, and maintenance of biomedical instruments and systems with special emphasis given to patient safety. Prerequisite: B.E.T. 801.

803. **BIOMEDICAL EQUIPMENT LABORATORY (INTERNSHIP) (4:1:6)** Practical experience, within or related to the hospital environment, on a variety of biomedical instruments. Prerequisites: B.E.T. 804 and Biol. 41.

804. **MEDICAL AND CLINICAL EQUIPMENT (3:2:2)** Principles of operation of clinical, medical radiography, intensive care, anesthesia, respiratory, non-invasive imaging, and emergency equipment; hospital electrical safety. Prerequisite: B.E.T. 801.

830. **SELECTED TOPICS IN BIOMEDICAL EQUIPMENT TECHNOLOGY (3)** Individual or group work in biomedical equipment technology for students with specific occupational objectives. Prerequisite: fourth-term standing.

### BUSINESS ADMINISTRATION (B A)

803. **COOPERATIVE PRACTICUM WITH BUSINESS OFFICES (6:0:12)** Cooperative practical work with business offices under the supervision of the instructor.

### BUSINESS LAW (B LAW)

243. **LEGAL ENVIRONMENT OF BUSINESS (3:3:0)** Social control through law: courts, basic policies underlying individual and contractual rights in everyday society. Prerequisite: fourth-term standing.



843. INTRODUCTION TO BUSINESS LAW (3:3:0) Legal institutions; basic legal principles pertaining to individual and contractual rights, with special emphasis on business operations and transactions.

850. REAL ESTATE LAW (3:3:0) Basic legal principles involved in the negotiation of real estate transactions. Prerequisite: B.Law 843.

## **BUSINESS LOGISTICS (B LOG)**

102. PHYSICAL DISTRIBUTION (3:3:0) Physical distribution function in business; role played by transportation, warehousing, location, inventory control; concept of a business logistics system. Prerequisite: fourth-term standing.

104. TRANSPORT SYSTEMS (3:3:0) Conceptual model of a transport system; environmental relationships; modal components and internal constraints, with special application to the United States. Prerequisite: fourth-term standing.

206. TRAFFIC MANAGEMENT (3:3:0) Analysis of the traffic function in the logistics system. Evaluation of routes, rates and shipping document procedures. Prerequisite: B.Log. 102 or 104.

## **CHEMICAL ENGINEERING TECHNOLOGY (CH E)**

800. TECHNICAL CALCULATIONS (3:3:0) Engineering units and their conversion. Technique of solving elementary problems in industrial stoichiometry, material balances, and heats of reaction. Prerequisite or concurrent: Chem. 13 and 15.

802. CHEMICAL TECHNOLOGY (3:3:0) Introductory discussion and problems relating to flow of fluids and transfer of heat. Prerequisite: fourth-term standing.

803. CHEMICAL TECHNOLOGY (3:3:0) Elementary discussion and problems involving evaporation, distillation, and air-water interaction. Prerequisite: Ch.E. 800.

820. CHEMICAL TECHNOLOGY LABORATORY (4:2:6) Measurements in fluid flow, heat transfer, distillation, mass transfer; chemical analytical techniques; industrial laboratory report writing. Prerequisite or concurrent: Ch.E. 803.

830. INDUSTRIAL CHEMISTRY (3:3:0) The commercial preparation of important chemicals and derivatives with emphasis upon the chemistry involved and the flow of material. Prerequisites or concurrent: Chem. 13 and 15.

831. SELECTED TOPICS IN CHEMICAL ENGINEERING TECHNOLOGY (3) Individual or group work in chemical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## **CHEMISTRY (CHEM)**

11. INTRODUCTORY CHEMISTRY (3:2:2) Selected principles and applications of chemistry. Prior study of chemistry not assumed.

12. CHEMICAL PRINCIPLES (3-4) Basic concepts and quantitative relations. Prerequisite: Satisfactory performance on placement examination—students take Chem. 12 for 3 credits. Unsatisfactory performance on placement examination—students take Chem. 12 for 4 credits.

13. CHEMICAL PRINCIPLES (3:3:0) Continuation of Chem. 12, including an introduction to the chemistry of the elements. Prerequisite: Chem. 12. Prerequisite or concurrent: Chem. 14.

14. EXPERIMENTAL CHEMISTRY (1:0:3) Introduction to quantitative experimentation in chemistry. Prerequisite or concurrent: Chem. 12.

15. EXPERIMENTAL CHEMISTRY (1:0:3) Continuation of Chem. 14 with emphasis on analytical procedures. Prerequisite: Chem. 14. Prerequisite or concurrent: Chem. 13.



## COURSE DESCRIPTIONS

23. **INTRODUCTION TO MODERN ANALYTICAL CHEMISTRY (4:2:4)** Contemporary methods of chemical and instrumental analysis, including potentiometric titration, specific ion electrodes, spectrophotometry, and chromatography. Prerequisite: Chem. 15.
34. **ORGANIC CHEMISTRY (3:3:0)** Introduction to organic chemistry with emphasis on the properties of organic compounds of biochemical importance. Prerequisite: Chem. 11 or 12.
35. **ORGANIC CHEMISTRY (3:2:4)** Introduction to organic chemistry with emphasis on the identification of organic compounds by characteristic chemical reactions and by spectroscopy. Prerequisite: Chem. 34.
102. **ENVIRONMENTAL CHEMISTRY (3:3:0)** Applications of chemistry to environmental problems, including air, water, thermal pollution; pesticides; drugs and birth control agents; food additives; etc. For nonchemistry majors; chemistry majors will not receive credit.
800. **GENERAL CHEMISTRY (3:2:3)** Basic principles of chemistry; properties and uses of some industrially important elements and compounds.

## CIVIL ENGINEERING TECHNOLOGY (C E)

809. **TOPOGRAPHIC DRAWING (2:0:4)** Conventional mapping symbols; constructing topographic maps from stadia notes; estimating grading quantities from topographic maps. Prerequisite: E.G. 1 or E.G. 10. Prerequisite or concurrent: C.E. 811 or Wildl. 812.
810. **STATISTICS AND LEAST SQUARES (3:2:2)** Frequency distribution; histograms; frequency polygons; measures of central tendency; dispersion; uses of normal curve; least squares applied to surveying problems. Prerequisite: Math. 803. Prerequisite or concurrent: C.E. 815.
811. **PLANE SURVEYING (3:2:3)** Theory of plane surveying; use, care, and adjustments of surveying equipment; traversing, areas, leveling, stadia, and plane table mapping. Prerequisite or concurrent: Math. 801.
812. **CURVES AND EARTHWORK (3:2:3)** Computation and laying out of horizontal and vertical curves; calculation of cut and fill; setting slope stakes for construction. Prerequisite or concurrent: C.E. 811, Math. 802.
813. **PRACTICAL FIELD PROBLEMS (4:1:9)** Geodetics, topography, field astronomy; route location; hydrographic surveys; land subdivision; use of electronic measuring devices. Prerequisites: C.E. 812, 818.
814. **PHOTOGRAMMETRY (3:2:3)** Interpretation and use of aerial photographs; mapping by photogrammetric methods; application of aerial and terrestrial photographic surveying to specific engineering problems. Prerequisite: C.E. 818.
815. **GEODETIC SURVEYING (3:2:3)** Precision vertical and horizontal control surveys; level nets; reciprocal leveling; triangulation; state plane coordinates; astronomic observations for azimuth and latitude. Prerequisites: C.E. 811, Math. 802.
816. **SPECIAL SURVEYS (3:2:3)** Applications of surveying in hydrography, mining, construction, and subdivision planning; surveying registration law and professional ethics. Prerequisites: C.E. 812, 813.
817. **CARTOGRAPHIC TECHNIQUES (2:0:4)** Use of tools and equipment; projections used in art, advertising, navigation, government maps; relief methods; scribing techniques; map reproduction methods. Prerequisite: C.E. 809.
818. **ROUTE SURVEYING (2:1:3)** Field and office operations connected with highway and railroad location; mass diagram as related to economical distribution of earthwork. Prerequisite: C.E. 811. Concurrent: C.E. 812.
821. **CONCRETE TECHNOLOGY (3:2:3)** Characteristics of Portland cement concrete, physical properties of constituent materials, testing procedures, basics of reinforced concrete. Prerequisite: E.Mch. 813.
822. **SOIL MECHANICS (3:2:3)** Identification, classification, sampling, testing, handling, and consolidation of soils for highway construction. Prerequisites: E.Mch. 810, Phys. 151.

823. **HIGHWAY ORGANIZATION AND OPERATIONS (3:3:0)** Fundamentals of technology; plans and specifications; drainage, cost, traffic studies, and highway safety. Prerequisite: second-year standing in Highway Engineering Technology.

824. **ASPHALT TECHNOLOGY (3:2:3)** The use and testing of asphaltic material as adapted to highways.

825. **CONSTRUCTION ESTIMATING (3:3:0)** Job organization, estimating, cost control, construction methods and equipment for highway construction projects.

830. **SELECTED TOPICS IN CIVIL ENGINEERING TECHNOLOGY (3)** Individual or group work in civil engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

861. **FLUID FLOW (3:3:0)** Elementary theory of fluid flow: hydrostatics; flow through orifices, Venturi meters, and pipes; flow in open channels; theory of the centrifugal pump. Prerequisites: E.Mch. 810 or 811, Math. 802.

890. **LEGAL ASPECTS OF SURVEYING (2:2:0)** Legal principles affecting the determination of property boundaries; responsibilities of surveyors, attorneys, title companies, and the court. Prerequisite: C.E. 811.

## CLOTHING AND TEXTILES (CL TX)

835. **PREPARATION FOR PRACTICUM (1:1:0)** Analysis of employee responsibilities in an operating store situation; preparation for ten weeks of approved store experience. Prerequisite: third-term standing.

836. **PRACTICUM (2)** A minimum of ten weeks of practical store experience approved by the student's major adviser, including an acceptable written report. Prerequisites: Cl.Tx. 835, Com. 804, 805.

## COMMUNITY DEVELOPMENT (COM D)

7. **INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0)** An introduction to the study of community, community systems, and impact on the individual.

870. **COMMUNITY LEADERSHIP (2:2:1)** Principles and techniques of participation in voluntary community groups concerned with strengthening family and community life.

## COMPUTER SCIENCE (CMPSC)

1. **BASIC COMPUTER PROGRAMMING (1:0:2)** Fundamental characteristics of digital computers; organization and coding of problems for solution on digital computer. Prerequisite: 2 entrance units in mathematics.

44. **TECHNIQUES OF ORGANIZATION (3:3:1)** Programming sequential and random access devices. Methods of organizing, sorting, merging files on cards, tapes, disks, and drums. Prerequisite: Cmp.Sc. 140.

54. **INTRODUCTION TO OPERATING SYSTEMS (3:3:1)** Techniques in multiprogramming, queuing, scheduling, handling of interrupts from peripheral devices. Prerequisite: Cmp.Sc. 44.

64. **CONTEMPORARY TRENDS IN COMPUTER PROGRAMMING (3:3:0)** State of the technology in the design of data-language processors, information processing systems, and large production programs in EDP. Prerequisite: Cmp.Sc. 54.

101. **INTRODUCTION TO ALGORITHMIC PROCESSES (3:3:0)** Properties of algorithms, languages, and notations for describing algorithms; applications of a procedure-oriented language to problem solving. Students who have passed Cmp.Sc. 201, 203, 401, or 402 may not schedule this course. Prerequisite: 2 entrance units in mathematics.

## COURSE DESCRIPTIONS

102. **COMPUTER ORGANIZATION AND PROGRAMMING (3:3:0)** Computer components and organization, representation of numbers and characters, instruction codes, machine-language programming, assembly systems, input-output, subroutines, and macros. Students who have passed Cmp.Sc. 211 or 410 may not schedule this course. Prerequisite: Cmp.Sc. 101.

110. **STRUCTURED PROGRAMMING WITH NUMERICAL METHODS (3:3:0)** Introduction to the disciplined construction of algorithms; structured programming; examples from text processing and elementary numerical methods; error analysis; recursion. Prerequisites: Cmp.Sc. 101 or 102; Math. 62.

140. **INTRODUCTION TO DATA PROCESSING (3:3:0)** Applications of digital computers to problems in data processing with examples from accounting, record updating, inventory control, and report generation. Prerequisite: Cmp.Sc. 101.

803. **COMPUTER APPLICATIONS IN BUSINESS (3:3:0)** Characteristics of digital computers; the role of data processing in business; programming in a high-level language. Designed for two-year business administration students. Students who have passed Cmp.Sc. 101, 201, or 203 may not schedule this course.

804. **UNIT RECORD PROCESSING (1:1:2)** Principles and practices of unit record processing.

805. **COMPUTER APPLICATION PROBLEM (1-3)** The organization, flow charting, programming, debugging, and documentation of a major applied problem in a field of computer application. Prerequisite: fifth-term standing.

890. **SPECIAL TOPICS IN COMPUTER PROGRAMMING (1-3)** Application of any of several specific computer programming languages to problem solving. Prerequisite: Cmp.Sc. 101.

## DAIRY SCIENCE (D SC)

802. **DAIRY PRODUCTION (2:1:2)** The feeding, management, breeding, milking, disease control, and housing of dairy cattle; economic factors contributing toward the enterprise.

## ECONOMICS (ECON)

2. **INTRODUCTORY MICROECONOMIC ANALYSIS AND POLICY (3:3:0)** Methods of economic analysis and their use; economic aggregates; price determination; theory of the firm; distribution.

4. **INTRODUCTORY MACROECONOMIC ANALYSIS AND POLICY (3:3:0)** National income measurement; aggregate economic models; money and income; policy problems.

14. **PRINCIPLES OF ECONOMICS (3:3:0)** Analysis of the American economy, emphasizing the nature and interrelationships of such groups as consumers, business, governments, labor, and financial institutions. Students who have passed Econ. 2 or are registered in the College of Business administration may not schedule this course.

315. **LABOR ECONOMICS (3:3:0)** An economic analysis of the labor market. Prerequisite: Econ. 2.

## ELECTRICAL ENGINEERING TECHNOLOGY (E E)

800. **APPLIED ELECTRICITY (2:1:3)** Fundamentals of electric circuits; basic principles of electrical machinery and devices; electrical-mechanical analogies; beginning electronics. Prerequisite: Math. 801.

801. **FUNDAMENTALS OF D.C. CIRCUITS (3:3:0)** Fundamental theory of resistance, current, voltage. Direct-current circuit concepts developed from simplest series circuit through loop analysis; Thevenin's theorem. Prerequisite: Math. 801.

804. **A.C. CIRCUITS (2:2:0)** Application of network theorems, laws, and methods to alternating-current circuits; balanced and unbalanced polyphase systems. Prerequisite: E.E. 814.



807. **A.C. AND ELECTRONICS LABORATORY (2:0:4)** Laboratory study of alternating-current circuits and semiconductors; assembly and tracing of electrical and electronic circuits. Must be taken with E.E. 804 and 810. Prerequisite: E.E. 818.
809. **D.C. CIRCUITS LABORATORY (2:0:4)** Introduction to electrical apparatus, including instruments, their interconnection into basic circuits, observation of circuit behavior, and report writing. Must be taken with E.E. 801.
810. **FUNDAMENTALS OF SEMICONDUCTORS (3:3:0)** Semiconductor physics and circuit theory including hybrid parameters; equivalent circuits; power amplifiers and frequency response of small signal amplifiers. Prerequisites: E.E. 814, Math. 803.
813. **FUNDAMENTALS OF ELECTRICAL MACHINES (3:2:2)** Direct-current machinery principles and applications; introduction to machines and basic concepts of laboratory methods related to machinery studies. Prerequisites: E.E. 814, 818.
814. **ELECTRICAL CIRCUITS (4:4:0)** Direct-current circuit analysis; introduction to basic magnetism and magnetic circuits; single-phase circuit fundamentals. Prerequisites: E.E. 801, Math. 802.
815. **A.C. MACHINERY AND CONTROL (4:4:0)** Alternating-current machinery principles and applications; survey of alternating- and direct-current machinery control methods. Prerequisites: E.E. 804, 813.
816. **LINEAR ELECTRONIC CIRCUITS (3:3:0)** Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, vacuum tubes and operational amplifiers. Prerequisite: E.E. 810.
817. **ADVANCED ELECTRONICS (4:4:0)** Fundamentals and application of pulse and digital circuits and electronic devices, such as unijunction transistors, photo devices, and zener diodes. Prerequisite: E.E. 816.
818. **ELECTRICAL CIRCUITS LABORATORY (1:0:2)** Laboratory study of direct-current networks and alternating-current circuits. Must be taken with E.E. 814. Prerequisite: E.E. 809.
819. **A.C. MACHINERY LABORATORY (1:0:2)** Alternators, induction generators, single- and polyphase motors, synchro units; transformers, saturable reactors, and protective devices. Must be taken with E.E. 815. Prerequisite: E.E. 807.
820. **ADVANCED ELECTRONICS LABORATORY (2:0:4)** Laboratory study of solid state pulse, digital, industrial and motor control circuits. Must be taken with E.E. 817. Prerequisite: E.E. 821.
821. **LINEAR ELECTRONICS LABORATORY (1:0:2)** Laboratory study of transistors; study of differential and operational amplifiers. Emphasis is placed on circuit design. Must be taken with E.E. 816. Prerequisite: E.E. 807.
830. **SELECTED TOPICS IN ELECTRICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in electrical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING (ENGR)

2. **ENGINEERING ORIENTATION (1:0:2)** Introduction to efficient methods for analyzing and solving engineering problems.
5. **EXPERIMENTAL METHODS FOR ENGINEERS (1:0:2)** Introduction to experimental methods used in engineering. Applications of basic experimental and computational concepts through student involvement in laboratory experiments.
801. **INTRODUCTION TO ENGINEERING (0:1:0)** Introduction to all functions and branches of engineering through general lectures.



## ENGINEERING GRAPHICS (E G)

1. ENGINEERING DRAWING (2:0:5) Technical skills and drafting room practices; fundamentals of theoretical graphics; orthogonal, oblique, and perspective projections; working and schematic drawings.
3. ARCHITECTURAL GRAPHICS (2:0:6) Principles of architectural drawing; spatial relationships of points, lines, planes, and solids with architectural applications; shadows, perspective.
10. INTRODUCTORY ENGINEERING GRAPHICS (1:0:3) Multiview projections, pictorial drawings, dimensioning, engineering standards, and working drawings.
11. ENGINEERING DESIGN GRAPHICS (1:0:3) Introduction to creative design, space analysis, graphs, graphical mathematics, vector analysis, and design implementation. Prerequisite: E.G. 10 or 21.
12. SPATIAL ANALYSIS (2:0:5) Spatial relations of points, lines, and solids, with engineering applications. Prerequisite: 1 credit of introductory graphics.
800. DRAWING ROOM STANDARDS AND PRACTICES (2:0:6) Interpretation of various types of engineering drawings, including dimensional systems, symbols, and American standard drafting room practices. Prerequisite: E.G. 10.
803. ADVANCED ENGINEERING DRAWING (3:1:5) Application of principles of engineering drawing, including auxiliary views in the layout of detail, assembly, and working drawings. Prerequisite: E.G. 1.
830. SELECTED TOPICS IN ENGINEERING GRAPHICS (1-3) Individual or group work in engineering graphics offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING MECHANICS (E MCH)

810. BASIC MECHANICS (2:2:0) Forces; moments; resultants; equilibrium of force systems; introduction to dynamics. Prerequisite: Math. 801.
811. ELEMENTARY MECHANICS (3:3:0) Forces; moments; resultants; equilibrium of force systems; friction; centroids and moment of inertia of areas; dynamics of particles. Prerequisite: Math. 801.
812. INTRODUCTION TO DYNAMICS (3:2:2) Absolute and relative motion related to particles and simple linkages. Force-mass-acceleration, work-energy, and impulse-momentum solution techniques. Prerequisite: 3 credits of E.Mch. 811. Prerequisite or concurrent: Math. 803.
813. STRENGTH AND PROPERTIES OF MATERIALS (3:3:0) Axial stress and strain; shear; riveted and welded connections; torsion; beam stresses and deflections; combined axial and bending stresses; columns, ductility, resilience, and toughness. Prerequisite: E.Mch. 811.

## ENGLISH (ENGL)

\*4. **BASIC WRITING SKILLS (1-3)** Intensive practice in writing sentences and paragraphs and instruction in grammar, usage, and punctuation. Designed for students with deficient preparation. This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.

10. **COMPOSITION AND RHETORIC I (3:3:0)** Organizing and writing clear expository essays. Prerequisite: Engl. 4 or satisfactory performance on English Proficiency Examination.

20. **COMPOSITION AND RHETORIC II (3:3:0)** Building and presenting cogent written arguments, with attention to style. Prerequisite: Engl. 10.

30. **HONORS FRESHMAN COMPOSITION (3:3:0)** Writing practice for specially qualified and screened students. Students who are exempt from Engl. 10 and have passed a special writing test will qualify for this course.

826. **REPORT WRITING (3:3:0)** Interpretation of statistical data and writing of technical reports. Prerequisite: Engl. 4 or 10.

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\*Although open to all students, it is especially designed to precede or supplement Engl. 10. Enrollment *either* on the basis of test scores, at the beginning of the term (3 credits), *or* from the first through sixth weeks of the term (1 credit).

## FINANCE (FIN)

108. **PERSONAL FINANCE (3:3:0)** Personal management of budgets, bank accounts, loans, credit buying, insurance, real estate and security buying. May not be scheduled by College of Business Administration students. Prerequisite: fourth-term standing.

210. **COMMERCIAL BANK MANAGEMENT (3:3:0)** Fundamental principles underlying management of a commercial bank; capital funds; asset and liability management; value maximization; legal and operational constraints. Prerequisite: Fin. 105.

807. **BANKING AND CORPORATE FINANCE (3:3:0)**

## FOOD SERVICE AND HOUSING ADMINISTRATION (FS HA)

50. **IN-SERVICE TRAINING (0-1)** Eight weeks or 300 hours of practical experience in operations of the type in which the student is majoring.

102. **INTRODUCTION TO FOOD SERVICE AND HOUSING ADMINISTRATION (3:3:0)** Professional duties of management personnel in large food and housing operations, their working conditions, and organizations which they serve.

103. **INTRODUCTION TO HEALTH FACILITIES FOOD SERVICE ADMINISTRATION (3:3:0)** Professional functions of the hospital food service system, relationships with the nutrition component of food service system, and organization served.

225. **FOOD AND LABOR MANAGEMENT AND CONTROL (3:3:0)** Techniques for analyzing and controlling costs in hospitality organizations. Prerequisite: 3 credits in accounting.

320. **HOSPITALITY INDUSTRY EQUIPMENT AND UTILITIES (3:3:0)** Principles governing the purchase, use and operation of heating, plumbing, refrigeration, air conditioning and other equipment and utilities.

321. **HOSPITALITY INDUSTRY MAINTENANCE (2:2:0)** Maintenance management in hospitality operations.

## COURSE DESCRIPTIONS

### FORESTRY (FOR)

800. INTRODUCTION TO FORESTRY (1:0:3) Introduction to the several branches of forestry through lectures, demonstrations, and field practice.
802. DENDROLOGY (2:0:6) Taxonomy of woody plants; their field identification; the geographic distribution of the important forest trees of the United States.
803. DENDROLOGY (2:0:6) Continuation of For. 802 with emphasis on the taxonomy of the angiosperms. Prerequisite: For. 802.
804. FOREST MENSURATION (3:2:3) Measurement of forests and forest products.
806. FOREST INVENTORIES (3:2:3) Application of land surveying and sampling techniques, including statistical analysis, for the determination of timber volume and growth.
807. FOREST RECREATION (3:2:3) Development, construction, and management of forest recreation areas and facilities. Prerequisite: For. 815.
808. FOREST PROTECTION (3:2:3) Forest fire prevention, detection, behavior, and suppression; fire plans and statistics; insect and disease control.
809. FOREST VALUATION (3:2:3) Determination of forest values through a consideration of markets, logging and milling costs, stumpage appraisals, and other forest values. Prerequisites: For. 806, 813.
810. FOREST IMPROVEMENTS (3:2:3) Use of materials and equipment in developing, operating, and maintaining the forest property.
811. FOREST PHOTO INTERPRETATION (4:2:6) Application of aerial photo interpretation techniques by forest technicians in land management. Prerequisite: For. 816.
812. ELEMENTS OF PROJECT SUPERVISION IN FORESTRY (3:3:0) Supervisory techniques and elements of project layout.
813. SUMMER FIELD PRACTICE (4) Concentrated field practice in selected elements of forestry, and introduction to field techniques in watershed, soils, and wildlife management. Prerequisite: For. 806.
814. FORESTRY LEADERSHIP PRACTICUM (1:0:3) Leadership techniques applied to standard forestry field operations. Prerequisite or concurrent: For. 812 and two terms of For. 800.
815. FOREST SURVEYING I (3:2:3) Basic plane surveying techniques as applied to forestry practices. Prerequisite or concurrent: Math. 801.
816. FOREST SURVEYING II (3:2:3) Standard mapping techniques as applied to field forestry situations. Prerequisite: For. 815.
817. URBAN FORESTRY (3:2:3) The application of land treatment techniques and forestry practices to urban environments. Prerequisites: For. 802, 807.
818. INDIVIDUAL STUDIES (1-3 per term) Individual study of forest technology.

### GEOGRAPHY (GEOG)

26. HUMAN GEOGRAPHY (3:3:0) Introduction to concepts, principles, and theories of spatial organization.

### GEOSCIENCES (GEOSC)

- \*1. PHYSICAL GEOLOGY (3:2:3) Earth processes and their effects on the materials, structure, and morphology of the earth's crust. Practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps.
- \*20. OUR EARTH (3:2:2) Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation.

\*21. EARTH HISTORY (3:2:2) Evolution of the earth; changing patterns of mountains, lowlands, and seas; development of living organisms. Practicum includes field trips, studies of geologic maps, geologic problems, fossils.

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\*This course includes from one to several field trips for which an additional charge will be made to cover transportation.

## HEALTH EDUCATION (HL ED)

303. EMERGENCY CARE (2:1:2) Competencies leading to American Red Cross Advanced First Aid and Emergency Care and American Heart Association Cardiopulmonary Resuscitation certification.

## HISTORY (HIST)

19. MODERN EUROPE, 1815 TO THE PRESENT (3:3:0) Growth of European democracy; scientific progress; Italian and German unification; Industrial Revolution; imperialism; the world wars; search for security and stability; Fascism and Communism.

21. HISTORY OF THE UNITED STATES SINCE 1865 (3:3:0) Integrated survey emphasizing the emergence of a dominantly urban-industrial society; expanded role of government; America's increasing involvement in world affairs.

156. (L.S. 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.

## HOTEL AND FOOD SERVICE (H F S)

802. SANITATION AND HOUSEKEEPING (3:3:0) Practical applications of sanitation principles to food service and housing delivery systems; organization and work methods in the housekeeping function.

804. HOTEL AND FOOD SERVICE MERCHANDISING (3:3:0) Merchandising as a system distributing benefits, collecting costs, concerned with motivating consumers. Topics include: promotion, menu planning, and research methods.

805. TRAINING AND SUPERVISION (3:3:0) Methods and techniques of training and supervising food service and housing employees for overall efficiency of operation.

810. FOODS EXPERIENCE (4:3:2) Theory, observation, and practice in food services; emphasis on planning, preparation, and service in commercial food operations.

850. FOOD SERVICE DELIVERY SYSTEMS (4) Physical characteristics of principal food product groups considered. Topics include: purchasing problems, preparation techniques, quality and cost control. Prerequisites: Acctg. 101, F.S.H.A. 225.

860. FOOD SERVICE SUPERVISION (4) The principal food service administrative routines are considered from the point of view of the supervisor and middle manager. Prerequisite: H.F.S. 850.

870. FOOD AND BEVERAGE ADMINISTRATION (4) Components of food service systems are identified and studied as separate problems and as a total system. Prerequisite: H.F.S. 860.

875. HOSPITAL FOOD OPERATING SYSTEMS (4) Consideration of hospital food service system as determined by patient needs, physical plant, operating policies, cost constraints and quality standards. Prerequisite: H.F.S. 860.



## COURSE DESCRIPTIONS

### HUMAN DEVELOPMENT (H DEV)

100. INTRODUCTION TO HUMAN DEVELOPMENT (1:1:0) Human development as a process of man-environment transactions, and the relationships of various fields to the study of that process.
200. EMPIRICAL INQUIRY IN HUMAN DEVELOPMENT (3:3:0) Introduction to methods and philosophy of empirical inquiry applied to problems of human development.
321. FIELD PROJECTS (1-12) Independent study and research in a human service program; written and oral summary of rationale, procedures, findings.

### HUMANITIES (HUMAN)

1. VALUES OF THE WESTERN CULTURAL HERITAGE (3:3:0) Fundamental values of human experience as expressed in outstanding philosophical and literary works.
2. SHAPING OF THE MODERN MIND (3:3:0) Relevance to the present age of influential literary and philosophical texts illustrative of the principal epochs of Western civilization.
21. IDEAS AND ARTS (3:3:0) Interaction of intellectual and aesthetic values from the Renaissance to the present.
50. THE LITERATURE AND LORE OF MINING (3:3:0) Experience and values of mining tradition: survey of the literature and lore, including fields research of various types of mining.
101. MODERN SCIENCE AND HUMAN VALUES (3:3:0) Relationships of science to the aspirations, values, and arts of man.
800. SOURCES OF MORALITY (3:3:0) The uses of law and love in man's endeavor to perfect himself.
801. SCIENCE, TECHNOLOGY, AND HUMAN VALUES (3:3:0) The effect of science and technology upon man's being, thought, and action.

### INDIVIDUAL AND FAMILY STUDIES (I F S)

16. EFFECTIVE INTERPERSONAL SKILLS (1:1:0) Training in interaction skills required for the development and maintenance of satisfying interpersonal relationships.
129. INTRODUCTION TO INDIVIDUAL AND FAMILY DEVELOPMENT (3:3:0) Introduction to psychosocial and family development at all stages of the individual and family life cycle.
319. FAMILY FINANCIAL MANAGEMENT (3:3:0) How families plan their finances and factors that determine their decisions.
329. INFANCY AND EARLY CHILDHOOD (3:3:0) Theories, research findings, and methods in social/behavioral/biological sciences related to developmental processes and intervention during infancy/early childhood. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.

### INDUSTRIAL ENGINEERING (I E)

315. INDUSTRIAL ORGANIZATION AND ADMINISTRATION (3:3:0) Fundamental principles of organization leading to intelligent appreciation of the simpler problems of factory organization and operation. Students registered in industrial engineering may not schedule this course.

### INDUSTRIAL ENGINEERING TECHNOLOGY (I E)

804. NOMOGRAPHY (1:0:2) The preparation of charts and monograms used in the analysis and presentation of engineering and production problems. Prerequisite: Math. 802.
805. ECONOMICS OF INDUSTRY (2:2:0) Internal economics of industrial enterprise, cost factors, and methods of comparing alternate proposals.

807. **STATISTICAL QUALITY CONTROL (3:3:0)** The application of this technique to the control of the manufacturing processes and to inspection. Prerequisite: Math. 802.
808. **PLANT LAYOUT (2:0:6)** Arrangement and layout of equipment and processes in an industrial plant for the most economical production. Prerequisites: E.G. 10, I.E. 816.
809. **INSPECTION AND QUALITY CONTROL (3:2:2)** Inspection methods and procedures and their application to control and acceptance sampling based on statistical methods. Prerequisite: E.G. 31.
810. **PRODUCTION LAYOUT AND CONTROL (3:1:6)** Arrangement of equipment and processes in industry and subsequent control of production through stores, routing, scheduling, dispatching, and follow-up techniques. Prerequisite: I.E. 816.
811. **MANUFACTURING MATERIALS AND PROCESSES (3:2:3)** Mechanical properties of materials; primary processing methods used in manufacturing, emphasizing ferrous metals, their relationship to other metals and nonmetals.
812. **MANUFACTURING PROCESSES (3:1:6)** Technology related to metal removal, dimensional inspection, metal joining, hot and cold forming heat treating, metal casting, properties of materials. Prerequisite: I.E. 811.
815. **PRODUCTION DESIGN (3:1:6)** The planning, designing, and specifying of both standard and special tools required for the production of manufactured goods. Prerequisites: E.G. 803, I.E. 812.
816. **METHODS ANALYSIS AND MOTION STUDY (3:1:6)** Construction and use of process charts, primary approach to operation analysis, and principles of motion economy. Prerequisite: I.E. 812.
817. **TIME STUDY AND WAGE PAYMENT (3:1:6)** Fundamentals of time study with instruction in time study practices; application of time studies to incentive wage payment systems. Prerequisite: I.E. 816.

## **INSURANCE (INS)**

800. **INSURANCE PRINCIPLES (3:3:0)** Introductory survey of all lines of insurance for handling business and personal risks.
810. **LIFE INSURANCE (3:3:0)** The life insurance contracts as methods of treating the problems of premature death and superannuation. Prerequisite: Ins. 800.
820. **PROPERTY AND CASUALTY INSURANCE (3:3:0)** Fundamental principles of property and casualty insurance. Prerequisite: Ins. 800.
830. **INSURANCE PRACTICUM (3:3:0)** Practical introduction to insurer operations in company and agency offices. Prerequisite: Ins. 820.

## **INTERNATIONAL BUSINESS (I B)**

862. **INTERNATIONAL BUSINESS (3:3:0)**

## **JOURNALISM (JOURN)**

200. **THE MASS MEDIA AND SOCIETY (3:3:0)** Mass communications in the United States; organization, role, content, and effects of newspapers, magazines, television, radio, books, and films. Students who are planning to enroll in, or who are currently enrolled in, the School of Journalism may not take this course.
800. **HISTORY AND SURVEY OF MASS COMMUNICATIONS (3:3:0)** History and role of mass media and advertising in society; nature of newspaper, magazine, broadcasting, book, and motion picture industries.

## COURSE DESCRIPTIONS

801. BEGINNING NEWS WRITING (3:1:4) Techniques of news writing with emphasis on organizing the story. Detailed critiques and class discussion of student writing. Prerequisites: Engl. 4, Journ. 800, ability to type.
802. BEGINNING REPORTING (3:1:4) The techniques of gathering news; problems of taste, ethics, and legality in reporting the news; community reporting assignments. Prerequisite: Journ. 801.
803. FUNDAMENTALS OF EDITING (3:1:4) Techniques of editing material for publication; printing processes; copyreading; headline writing; typography; picture editing; layout; legal and ethical considerations. Prerequisite: Journ. 802.
804. REPORTING THE COMMUNITY (3:0:9) Practicum in newspaper reporting, editing, and production. Prerequisite: Journ. 803.
811. ADVERTISING COPYWRITING (3:1:4) Techniques of writing advertising headlines and copy, with emphasis on spelling, grammar, and word choice. Detailed critiques of student writing. Prerequisite: Journ. 800.
812. ADVERTISING LAYOUT (3:1:4) Print advertisement design and production, including typography, plate making, mat services, shop procedures, etc.; detailed critiques of layouts; field trips. Prerequisite: Journ. 800.
813. ADVERTISING MEDIA AND CAMPAIGNS (3:1:4) Media selection and coordination, creative strategy, and campaign execution. Each student plans and produces a complete advertising campaign. Prerequisites: Journ. 811, 812.
814. NEWSPAPER ADVERTISING (3:0:9) Management of the newspaper advertising department, advertising sales promotion, preparing the sales presentation, dealing with the advertiser, advertising page make-up. Prerequisite: Journ. 813.
820. NEWSPAPER MANAGEMENT (3:3:0) Managing and publishing newspapers in the United States; problems of law, finance, personnel, promotion, technological change, and community service. Prerequisite: Journ. 803 or 813.

## LABOR STUDIES (L S)

100. INDUSTRIAL RELATIONS (3:3:0) Introductory analysis of the employment relationship and of the interrelated interests of managements, workers, unions, and the public.
102. STRUCTURE AND FUNCTION OF UNIONS (3:3:0) A study of the internal structure, goals, and impact on society of unions.
103. LABOR LEGISLATION (3:3:0) A study of legislation regulating the functioning of trade unions.
104. THE PRACTICE OF COLLECTIVE BARGAINING (3:3:0) A study of the process of collective bargaining, the issues in collective bargaining, and bargaining relationships.
156. (Hist. 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.
296. INDEPENDENT STUDIES (1-12)

## MANAGEMENT (MGMT)

800. PRINCIPLES OF MANAGEMENT (3:3:0)
801. PRINCIPLES OF MANAGEMENT (3:3:0) Prerequisite: Mgmt. 800.
802. SUPERVISORY MANAGEMENT (3:3:0) Preparation for supervisory positions in formal organizations. Emphasis placed on the motivational aspects of the supervisor's job. Prerequisite: Mgmt. 800.

## MAN-ENVIRONMENT RELATIONS (M E R)

213. PRINCIPLES OF CLOTHING I (2:2:0) Analysis of aesthetic, functional, and socio-psychological factors related to clothing needs and usage.

214. PRINCIPLES OF CLOTHING II (2:2:0) Current cultural influences on the designer, design media, and construction processes in the mass production technology of clothing. Prerequisite: M.E.R. 213.

215. CLOTHING CONSTRUCTION (1-4) Experimentation with construction techniques for selected fabrics and design requirements. Prerequisite or concurrent: M.E.R. 213, or consent of instructor.

301. ELEMENTARY TEXTILES (3:2:2) Recognition, use, and care of textiles related to characteristics of fibers, yarns, fabric construction, and finishes. Prerequisite: Chem. 11 or Ph.Sc. 8.

## MARKETING (MKTG)

800. PRINCIPLES OF MARKETING (3:3:0)

801. PRINCIPLES OF MARKETING (3:3:0) Prerequisite: Mktg. 800.

802. PROMOTION MANAGEMENT (3:3:0) The application and management of various forms of persuasive communication with potential customers: personal selling, sales management, advertising, sales promotion. Prerequisite: Mktg. 801.

803. PRINCIPLES OF RETAILING (3:3:0) Introduction to the management of retailing organizations, with emphasis on decision making. Not open to retailing majors.

804. PRINCIPLES OF RETAILING SALESMANSHIP (3:3:0) Principles of selling applied to the retail level of trade; practical application of these principles in various sales situations.

805. RETAILING I (3:3:0) An analysis of the management and merchandising policies of various types of retailing institutions.

806. RETAILING II (3:3:0) Merchandising, promotion, and control policies of retail store management. Prerequisite: Mktg. 805.

807. INTRODUCTION TO MARKETING RESEARCH (3:3:0) Managerial aspects of marketing research, with emphasis on practical details of operating a small-scale project. Prerequisites: Mktg. 800, Q.B.A. 801.

## MATERIALS TECHNOLOGY (MAT T)

800. INTRODUCTION TO MATERIALS TECHNOLOGY (4:3:2) Introduction to the nature of inorganic materials, types of manufacturing processes involved, and general characteristics of the products.

801. CHEMISTRY OF MATERIALS (4:3:2) Chemistry of the preparation and blending of raw materials; forming and firing operations and subsequent treatments of the material.

802. PHYSICS OF MATERIALS (4:3:2) Physical changes occurring during firing processes and in subsequent treatment of the materials.

803. MATERIALS TESTING (4:2:4) Applications of testing procedures to determine properties of inorganic materials.

804. SUMMER FIELD PRACTICE (4) Practical experience in the material industries; plant experience with equipment utilized in processing, manufacturing, and testing of inorganic materials.



## MATHEMATICS (MATH)

4. INTERMEDIATE ALGEBRA (3:2:2) Polynomials, fractions, exponents, radicals, first and second degree equations and inequalities, relations and functions, systems of equations. Limited to students whose scores on the algebra proficiency examination indicate a need for this course.
5. COLLEGE ALGEBRA (3:2:2) Relations and functions; roots of polynomials and complex numbers; sequences, mathematical induction; binomial theorem; matrices, determinants; analytic geometry. Prerequisite: 1 unit of algebra or Math. 4.
10. PRECALCULUS MATHEMATICS (3:3:0) Polynomial expressions; simultaneous equations; exponents, logarithms, binomial theorem; polynomial roots; trigonometric functions; right triangles; identities, lines and conic sections. Limited to students whose scores on the algebra and trigonometry proficiency examination indicate a need for this course.
17. FINITE MATHEMATICS (3:3:0) Introduction to logic, sets, probability. Prerequisite: 3 units of high school mathematics.
18. ELEMENTARY LINEAR ALGEBRA (3:3:0) Matrices and vectors; transformations; systems of linear equations; convex sets and linear programming. Prerequisite: 3 units of high school mathematics.
20. TECHNIQUES OF CALCULUS I (3:3:0) Functions and graphs, derivatives, applications. Students may take only one course for credit from Math. 20, 61, 61A, 65. Prerequisite: a satisfactory score on the algebra proficiency examination or, in the case of an unsatisfactory score, the course(s) necessary to make up the deficiencies.
21. TECHNIQUES OF CALCULUS II (3:3:0) Derivatives, integrals, applications, linear algebra. Students may take only one course for credit from Math. 21, 62, 66. Prerequisite: Math. 20.
35. GENERAL VIEW OF MATHEMATICS (3:3:0) Survey of mathematical thought in logic, geometry, combinatorics, and chance.
36. INSIGHTS INTO MATHEMATICS (3:3:0) Examples of mathematical thought in number theory, topology, theory of symmetry, and chance. Prerequisite: one unit of algebra or Math. 4.
800. BUSINESS MATHEMATICS (3:3:0) Review of arithmetic, decimals, fractions, percentages, interest, and discounts; introduction to algebraic techniques; applications to business computations.
- 801-802. TECHNICAL MATHEMATICS (3:3:0 each) Elements of algebra and trigonometry for students in two-year technical programs. Prerequisites: 1 unit in algebra, 1 unit in plane geometry.
803. TECHNICAL CALCULUS (3:3:0) Selected introductory topics from analytic geometry, differential calculus, integral calculus. Prerequisites: Math. 801, 802.

## MECHANICAL ENGINEERING TECHNOLOGY (M E)

800. MECHANISMS (2:0:4) Motion in machine elements; strength and properties of materials; design of machine elements. Prerequisite: E.Mch. 811.
805. KINEMATICS (3:2:3) Graphical and analytical studies of relative motions, instant centers, velocity and acceleration in plane motions, slider crank mechanisms, cams, gears, gear trains, and flexible connectors. Prerequisites: E.G. 1, E.Mch. 811.
807. HEAT TRANSFER (3:3:0) Basic principles of conduction, convection, and radiation, emphasizing practical applications.
810. PRODUCT DESIGN (3:1:6) Design of machine elements including levers, bearings, shafts, clutches, springs, and gears; selection of ball bearings and belts; design of small mechanical devices. Prerequisites: E.Mch. 813, M.E. 805.
830. SELECTED TOPICS IN MECHANICAL ENGINEERING TECHNOLOGY (3) Individual or group work in mechanical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

880. AIR POLLUTION ANALYSIS INSTRUMENTATION (8) Principles and applications of instruments for measuring particle and gaseous pollutants; theory, installation, operation, maintenance, and related instrumentation. Prerequisite: Math. 803 or one course in college mathematics.

881. ELEMENTARY THERMO AND FLUID DYNAMICS (2:2:0) Basic problems in compressible fluid flow. Laws of dynamics and thermodynamics, mechanical properties of fluids, elementary heat transfer. Prerequisites: Math. 803, Phys. 150.

882. AIR RESOURCE MANAGEMENT (2:2:0) Introduction to air pollution. Pollutants, sources, effects, air monitoring systems, air quality criteria and standards, governmental control programs and procedures.

883. AIR POLLUTION ANALYSIS INSTRUMENTATION (3:2:1) Fundamentals of chemistry, electronics, fluid flow, and small particle technology as applied to air pollution instrumentation. Prerequisites: Chem. 13, Phys. 150.

884. SAMPLING AND MONITORING PROGRAM (2:0:4) Instrumentation and site selection, field data acquisition for major air pollutants, data analysis and evaluation.

## **METALLURGY (METAL)**

800. METALLURGICAL LABORATORY PRACTICE (4:2:4) Instruction and practice in various metallurgical techniques. Prerequisites: E.G. 10, Math. 802. Prerequisite or concurrent: Phys. 150.

801. FERROUS METALLURGY (3:2:2) Making, shaping, and heat treatment of cast irons and steels. Prerequisites: Chem. 12, Metal. 800.

802. PHYSICAL METALLURGY (3:2:2) Structures of metals and alloys; structure manipulations; structure-property relationships. Prerequisites: Phys. 150, Math. 802, Metal. 800.

803. NONFERROUS METALLURGY (3:2:2) Reduction of nonferrous metals from their ores and subsequent compositional adjustment by refining and alloying. Prerequisites: Chem. 12, Metal. 800.

804. PLANT TRIPS (1:0:3) Plant visits to study industrial ferrous and nonferrous metallurgical operations. Spring term, odd years.

805. METALLURGICAL OPERATIONS (1:0:2) Classroom discussion by local metallurgists pertaining to their work and the role of the metallurgical associate in their operations. Spring term, even years.

## **METEOROLOGY (METEO)**

303. INTRODUCTORY METEOROLOGY (3:2:2) Nontechnical treatment of fundamentals of modern meteorology; effect of weather and climate on man and his activities. A student who took Meteo. 300 or 304 may take this course for 1 credit only.

## **MICROBIOLOGY (MICRB)**

1. INTRODUCTORY MICROBIOLOGY (3:3:0) Elementary principles of microbial and viral interrelationships, morphology, and physiology; relation to food, water, soil, industry, and disease processes. Prerequisite: Chem. 12.

2. INTRODUCTORY MICROBIOLOGY LABORATORY (2:0:4) Qualitative and quantitative techniques with regard to recognition of bacteria and their processes on a microscopic, colonial, and physiological basis. Prerequisite or concurrent: Micrb. 1. Prerequisite: Chem. 12.

6. ELEMENTARY MICROBIOLOGY (2:2:0) Importance of microorganisms in public health and disease, agriculture and industry; descriptive course for nontechnical students.

## COURSE DESCRIPTIONS

7. **ELEMENTARY MICROBIOLOGY LABORATORY (1:0:2)** Selected techniques with regard to recognition and enumeration of bacteria; effects of chemical and physical agents on microorganisms. Prerequisite or concurrent: Micrb. 6.

101. **MEDICAL MICROBIOLOGY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15)** Procedures and techniques used to isolate and diagnose clinically significant organisms such as bacteria, fungi, and other human parasites. Prerequisites: Micrb. 1, 2.

102. **HEMATOLOGY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15)** Theoretical and practical aspects of hematological diagnostic studies related to erythrocyte and leukocyte disorders in man.

801. **CLINICAL LABORATORY ORIENTATION FOR MEDICAL LABORATORY TECHNICIANS (8:5:15)** Introduction to basic principles of clinical laboratory work, including the collection, handling, and preparation of biological samples.

## MINERAL PROCESSING (MN PR)

61. **INTRODUCTION TO COAL PREPARATION (3:3:0)** Theory and application of modern coal preparation practice. Sampling, crushing, sizing, gravity concentration, flotation, dewatering, drying; pollution control; flowsheets.

## MINING (MNG)

23. **MINERAL LAND AND MINE SURVEYING (3:0:9)** Surveying theory and practice applied to mineral lands and mines; traversing, leveling, mapping, shaft plumbing; stope, room, and development surveying. Prerequisite: E.G. 11,  $\frac{1}{2}$  unit of secondary school trigonometry.

30. **INTRODUCTION TO MINING ENGINEERING (3:2:3)** Examination, development, and exploitation of mineral deposits in case studies of mineral deposits and mines; unit operations, cycling, equipment, methods.

## MINING TECHNOLOGY (MNG T)

800. **MINING TECHNOLOGY ORIENTATION (1:0:2)** Films, slides, and lectures to acquaint the student with the coal mining industry and its impact on society.

801. **COAL MINING TECHNOLOGY (3:2:3)** Analysis of coal mining systems; integration of unit operations and mining methods for efficient mine production.

802. **MINE VENTILATION (3:2:3)** Quality and quantity analysis and control of mine atmosphere. Prerequisites or concurrent: Chem. 11, Phys. 150, Mng.T. 801.

803. **STRATA CONTROL (3:2:3)** Fundamentals of stresses and strains in rocks; virgin and concentrated stresses; roof support, subsidence, bursts, and stability control. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Mng.T. 801.

804. **MINE PLANT TECHNOLOGY (3:2:3)** Electrical systems in mines; mechanical power applications and materials handling systems. Prerequisite: Phys. 150.

805. **MINE SYSTEMS TECHNOLOGY (3:2:3)** Quantitative methods of work measurement and their application to production and method study problems related to mines. Prerequisite: Mng.T. 801.

806. **MINE MANAGEMENT AND LAW (3:3:0)** The problems of the individual in coal mine management in relation to environment, employer, union, and law.

807. **ELECTRICAL MINE MACHINE CIRCUITS (3:2:3)** Topics of electrical power fundamentals, power and control circuits, and motors and their mine applications will be covered. Prerequisite: Mng.T. 804.



808. **MINE POWER DISTRIBUTION (3:2:3)** Topics of high voltage circuits, underground transmission, power stations, power conversion, safety regulations and power devices will be covered. Prerequisite: Mng.T. 804.

809. **MINE MACHINERY HYDRAULICS (3:2:3)** Topics of basic hydraulic principles and their application to mining and mine machinery will be covered. Prerequisites: Math. 802, Phys. 150.

810. **MINE MACHINE DYNAMICS (3:2:3)** Topics on basic machines and their application to the principles of mine machine operation will be covered. Prerequisites: E.Mch. 811, Phys. 150.

811. **PRACTICUM IN MINE MAINTENANCE (3:0:9)** Field and shop techniques in procedures of electrical, mechanical and hydraulic phases of mine maintenance will be covered. Prerequisites: Mng.T. 804, Phys. 150.

## **MUSIC (MUSIC)**

5. **THE FUNDAMENTALS OF MUSIC APPRECIATION (3:3:0)** Recitation and lectures with recorded examples of melody, harmony, rhythm, vocal and instrumental timbre, form, and program and absolute music.

## **MUSIC EDUCATION (MU ED)**

806. **MUSIC SKILLS FOR RECREATION LEADERS (3:3:0)** Theories and practice in music activities found in group and club settings. Appreciation, leadership techniques, and fundamental musicology.

## **NUCLEAR ENGINEERING TECHNOLOGY (NUC E)**

800. **NUCLEAR AND ATOMIC SCIENCE (2:2:0)** Introduction to the theories of atomic and nuclear structure and electromagnetic radiation. Prerequisites: Phys. 151, Math. 803.

801. **RADIOLOGICAL SAFETY (2:2:0)** Discussion of basic radiation dose units, radiation monitoring techniques, biological effects of radiation, and AEC regulations. Prerequisite or concurrent: Nuc.E. 800.

802. **ELEMENTS OF NUCLEAR TECHNOLOGY (2:2:0)** Study of nuclear radiations, nuclear interactions, neutron diffusion, and reactor materials. Prerequisite: Nuc.E. 800.

803. **ELEMENTS OF NUCLEAR POWER GENERATION (3:3:0)** Survey of various reactor types with emphasis on fuel heat removal and power generation, shielding, fuel fabrication and reprocessing. Prerequisite: Nuc.E. 802.

804. **INTRODUCTION TO REACTOR TECHNOLOGY (3:3:0)** Steady state reactor theory, kinetic behavior of reactors and reactor control systems. Prerequisite: Nuc.E. 802.

805. **PRINCIPLES OF MEASUREMENT (3:2:2)** A study of measurement in the nuclear industry, including the instruments used, accuracy of measurement, and statistical justification. Prerequisites: E.E. 814, Phys. 151.

812. **NUCLEAR TECHNOLOGY LABORATORY (3:1:4)** Laboratory study of radiation measurements and the diversified application of nuclear techniques. Prerequisites: Nuc.E. 801, 802.

814. **REACTOR TECHNOLOGY LABORATORY (3:1:4)** Laboratory study of basic reactor experiments, control rod calibration, critical experiment, etc. Emphasis placed upon reactor operations. Must be taken with Nuc.E. 804. Prerequisite: Nuc.E. 801.

830. **SELECTED TOPICS IN NUCLEAR ENGINEERING TECHNOLOGY (3)** Individual or group work in nuclear engineering technology for students with specific occupational objectives. Prerequisite: fourth-term standing.



## COURSE DESCRIPTIONS

### NURSING (NURS)

800. FOUNDATIONS OF TECHNICAL NURSING I (6:4:8) Role of the nurse in society and the health care team; nursing techniques used to meet basic patient needs.
801. FOUNDATIONS OF TECHNICAL NURSING II (6:4:8) Nursing techniques utilized to meet the needs of the patient undergoing diagnosis or basic medical or surgical treatment. Prerequisites or concurrent: Biol. 29, 41, Micrb. 6, Nurs. 800.
802. TECHNIQUES OF NURSING IN CHILDHOOD (7:3:16) Application of nursing techniques to the health needs of persons in the 2-week-old to 19-year-old age group. Prerequisite: Nurs. 801.
803. TECHNIQUES OF NURSING THE MATURE PATIENT (7:3:16) Application of nursing techniques to the health needs of persons in the 20-year-old to 40-year-old age group. Prerequisite: Nurs. 801.
804. TECHNIQUES OF NURSING THE PATIENT IN THE MIDDLE YEARS (7:3:16) Utilization of nursing techniques to meet the health needs of persons in the 41-year-old to 65-year-old age group. Prerequisite: Nurs. 801.
805. TECHNIQUES OF NURSING THE PATIENT IN SENESCENCE (7:3:16) Application of nursing techniques to meet the health needs of persons over 65 years of age. Prerequisite: Nurs. 801.
806. NURSING SEMINAR (3:3:0) Current issues in nursing, and adjustments of the student to the role of the graduate technical nurse. Prerequisite or concurrent: Nurs. 801.

### NUTRITION (NUTR)

150. ELEMENTARY NUTRITION (2:2:0) Fundamentals of nutrition and its relation to human health. Students who have passed Nutr. 351 may not schedule this course.
351. INTRODUCTORY PRINCIPLES OF NUTRITION (3:3:0) The nutrients, food sources and physiological functions as related to human growth and well-being throughout life; current nutrition issues. Students who have passed Nutr. 150 may not schedule this course.
800. NORMAL DIET MODIFICATIONS (4:3:3) Modifications of normal diet to meet therapeutic needs in patient care and rehabilitation.
801. NUTRITION COMPONENT OF THE FOOD SERVICE SYSTEM (3:3:0) Introduction to basic nutrition principles and their application in a food service system.

### PHILOSOPHY (PHIL)

1. INTRODUCTION TO LOGIC (3:3:0) Principles of correct thinking; deductive and inductive inference; use and misuse of language in reasoning.
2. INTRODUCTION TO PHILOSOPHY (3:3:0) Evaluation of the intellectual and moral tone of the present day through a study of existentialism and other recent philosophies. Prerequisite: fourth-term standing.
4. BASIC PROBLEMS OF PHILOSOPHY (3:3:0) How important philosophers have treated the perennial problems of knowledge, reality, free will, etc.
12. ELEMENTS OF SYMBOLIC LOGIC (3:3:0) How to translate arguments into symbolic language and test them for validity using truth-tables and deduction rules. For nonscience majors.
212. SYMBOLIC LOGIC (3:3:0) The logic of classes, propositions, relations, and quantification; the nature and properties of formal systems. Intended primarily for science-oriented students. Prerequisite: fourth-term standing.

## PHYSICAL EDUCATION (PH ED)

\*5. PHYSICAL EDUCATION (1:0:3 per term) Activities to develop physical and recreational skills; beginning swimming required of those who fail swim-safety test. Selection from archery, badminton, bowling, canoeing, cross-country skiing, dancing, fencing, figure skating, golf, handball, hunter safety, orienteering, racquetball, riflery, sailing, scuba, squash, survival training, swimming, tennis, volleyball, weight training, and others. Typically, two activities per term.

801. LIFETIME SPORTS (1:0:3) Basic understanding of the fundamentals of lifetime sports and the leadership and supervision of such sports.

802. SWIMMING (1:0:3) Fundamentals of swimming and the supervision of aquatic facility programs.

803. GAMES FOR CHILDREN (1:0:3) Low organized and lead-up games with emphasis on age group differences.

804. DANCE AND GYMNASTICS (1:0:3) Understanding dance forms and rudiments of gymnastics.

805. TEAM SPORTS (1:0:3) Basic understanding of the fundamentals of team sports, and the leadership and supervision of such sports.

806. OFFICIATING (1:0:3) Theory and practice of officiating games and sports.

807. ADAPTED ACTIVITIES (1:0:3) Adaptation of activities and methods of presentation of games for the handicapped.

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\*Must be repeated for a total of 3 credits to satisfy University Baccalaureate Degree Requirements.

## PHYSICAL SCIENCE (PH SC)

7. PHYSICAL SCIENCE (3:3:0) Development of physics, including modern physical concepts and their relationship to the careers of physical scientists. May not be scheduled by students who have received credit for Phys. 201 or 215.

8. PHYSICAL SCIENCE (3:3:0) Selected concepts of chemistry showing their development, interrelationship, and present status. May not be scheduled by students who have received credit for Chem. 11 or 12.

## PHYSICS (PHYS)

150. TECHNICAL PHYSICS (3:2:2) Elementary treatment of topics in mechanics, heat, wave motion, and sound leading toward an understanding of technical applications. Prerequisite: 1½ units of algebra. Prerequisite or concurrent: Math. 801.

151. TECHNICAL PHYSICS (3:2:2) Elementary treatment of topics in electricity, light, and modern physics leading toward an understanding of technical applications. Prerequisite: Phys. 150.

215. INTRODUCTORY PHYSICS (4:3:2) Selected topics in mechanics, heat, and sound. Prerequisite: algebra to quadratics.

265. INTRODUCTORY PHYSICS (4:3:2) Selected topics in light, electricity, and magnetism. Prerequisite or concurrent: Phys. 215.

297. SPECIAL TOPICS (1-6)

## **COURSE DESCRIPTIONS**

### **PLANT SCIENCE (PLTSC)**

800. FIELD AND FORAGE CROP PRODUCTION (3:2:2) Production of field crops and pastures; management practices in relation to crop species; soil adaptation for desired yield and use.

801. PRODUCTION OF HORTICULTURAL CROPS (3:2:2) The application of scientific principles to horticultural crop production.

802. USE OF AGRICULTURAL CHEMICALS (3:2:2) Principles and practices relating to safe and effective control of weeds, insects, and plant diseases through use of chemical toxicants.

### **POLITICAL SCIENCE (PL SC)**

1. AMERICAN NATIONAL GOVERNMENT (3:3:0) Development and nature of American political culture; constitutional and structural arrangements; policy-making processes; sources of conflict and consensus.

### **POULTRY SCIENCE (PTYSC)**

801. POULTRY PRODUCTION (2:1:2) Practical aspects of poultry, nutrition, management, disease control, and marketing in the production of broilers, eggs, and turkeys.

### **PSYCHOLOGY (PSY)**

2. PSYCHOLOGY (3:3:0) Introduction to general psychology; principles of human behavior and their applications.

13. INTRODUCTION TO DEVELOPMENTAL PSYCHOLOGY (3:3:0) Developmental principles; physical growth; linguistic, intellectual, emotional, and social development from infancy to maturity. Prerequisite: Psy. 2.

37. MENTAL HEALTH (3:3:0) Maintaining adjustment, developing a well-balanced personality; behavior disorders and their treatment. May not be used as prerequisite for any course in psychology. Not open to psychology majors or those who have credit for Psy. 437.

### **QUANTITATIVE BUSINESS ANALYSIS (Q B A)**

101. INTRODUCTION TO QUANTITATIVE BUSINESS ANALYSIS (3:3:0) Introduction to quantitative methods for conceptualizing business and management problems. Prerequisite: Math. 18 or 20.

102. ELEMENTARY BUSINESS STATISTICS (3:3:0) Statistical inference; estimation, hypothesis testing, testing, correlation and regression; application of statistical techniques to economic and business problems. Prerequisite: Q.B.A. 101.

801. ELEMENTARY BUSINESS STATISTICS (3:3:0) Collection, tabulation, measurement, presentation, and interpretation of quantitative material. Prerequisite: fourth-term standing.

### **RADIOLOGIC TECHNOLOGIST RADIOGRAPHER (R T R)**

1. HISTORY OF RADIOLOGY; ELEMENTARY RADIATION PROTECTION; MEDICAL ETHICS (1:2:6) History of radiology field, basic principles of radiation protection, applications of medical ethics, basic office procedures, departmental structure.

20. MEDICAL TERMINOLOGY; RADIOGRAPHIC POSITIONING I (1:3:5) Introduction to the medical profession's language; basic positional terminology, emphasis on skeletal positioning with skull introduction.

30. RADIOGRAPHIC EXPOSURE I; FILM CRITIQUE I (1:3:5) Preliminary exposure factors concerning radiographic imaging; evaluation of radiographic films.
40. RADIOGRAPHIC POSITIONING II: CONTRAST PROCEDURES; NURSING PROCEDURES (5:3:13) Body system positionings, radiologic applications on contrast media, nursing procedures pertinent to radiologic technology. Prerequisite: R.T.R. 20.
50. RADIOGRAPHIC EXPOSURE II (1:2:5) Emphasis on problem solving and formation of technique chart. Prerequisite: R.T.R. 30.
60. DARKROOM CHEMISTRY; FILM CRITIQUE II (1:3:5) Film composition, manifestation of latent image and film processing techniques; continuation evaluation of radiographic films. Prerequisites: Chem. 11, R.T.R. 30.
70. RADIOGRAPHIC POSITIONING III (1:2:6) Review of skeletal, skull, and body systems; emphasis on pediatric, geriatric, psychiatric, and intra-oral radiography. Prerequisite: R.T.R. 40.
80. SPECIAL PROCEDURES; REGISTRY REVIEW (1:5:14) Invasive contrast procedures pertinent to radiology. Tomography, paradiologic imaging modalities; review for registry examination. Prerequisite: R.T.R. 70.
90. MEDICAL AND SURGICAL DISEASES; REGISTRY REVIEW II (1:3:14) Review for registry examination, definition of various diseases, and pathology pertaining to bodily systems. Prerequisites: Biol. 41, R.T.R. 80.

## REAL ESTATE (R EST)

800. REAL ESTATE PRINCIPLES (3:3:0) Nature of the real estate market; introduction to the functions performed in the real estate business.
810. REAL ESTATE SALES (3:3:0) Principles underlying the sale of real estate; the use of selling tools and procedures in the analysis of customers' needs.
830. REAL ESTATE FINANCE (3:3:0) Basic principles of real estate finance; sources of funds for financing real estate.

## RECREATION AND PARKS (RC PK)

120. MAN AND LEISURE (3:3:0) Introduction to leisure in historical and contemporary perspective. Relationships between leisure and other social institutions. Determinants of leisure behavior.
130. OUTDOOR LIVING SKILLS (1:0:3) Direct experience with outdoor living skills and backpacking; weekend campout. American Camping Association's Advanced Campcraft certification skills covered. Prerequisite: American Red Cross Standard First Aid and Personal Care certificate recommended.
150. THE SCOPE OF RECREATION AND PARKS SERVICES (1) Observation of and exposure to components, programs, and agencies which make up the field of recreation and parks services.
190. THE ROLE OF THE RECREATION AND PARKS PROFESSIONAL (1:1:0) Orientation to role of recreation and parks professionals in providing leisure services in various settings and through diverse agencies. Prerequisite: Rc.Pk. 120.
230. CAMP COUNSELING (2:1:2) Counselor skills and responsibilities for the organized camp.
236. THEORY AND PRACTICE OF RECREATION LEADERSHIP (3:2:2) Methods and materials; experience in recreation leadership with different age groups and in a variety of school and community settings.
850. FIELD PRACTICUM (3) Observation and participation in a recreation system, hospital, youth-serving agency, or other setting.
856. RECREATION PROGRAM PLANNING (3:3:0) The theory and exploration of program planning in the various recreation settings. Policies and philosophies pertinent to the program areas.



## COURSE DESCRIPTIONS

875. INTRODUCTION TO THERAPEUTIC RECREATION (3:3:0) Recreation for the mentally retarded, physically handicapped, emotionally disturbed, the aged, and the culturally different in institutions and community settings.

877. THERAPEUTIC RECREATION PROGRAM (3:3:0) Critical examination of therapeutic recreation leader's role in relation to other human services, activity analysis and counseling techniques. Prerequisite: Rc.Pk. 875.

## RETAILING (RTL)

833. SELECTION AND USE OF TEXTILES (3:2:4) Selection, use, and care of textile products as affected by fiber, yarn, and fabric construction, and finishing processes.

834. FORCES OPERATING IN THE CLOTHING AND TEXTILE INDUSTRY (2:2:0) Description of ways in which operations of the various segments of the clothing and textiles industry impinge on retailing. Prerequisites: Mktg. 804, 805, 806.

840. MANAGEMENT IN THE HOME (3:3:0) The principles of decision making, work simplification, use of equipment, and home safety applied to family management.

850. DISPLAY TECHNIQUES (2:1:3) Display as visual communication, emphasizing the techniques related to merchandising and art. Prerequisite: an art or art appreciation course.

## SOCIAL SCIENCE (SO SC)

1. THE URBANIZATION OF MAN: A SOCIAL SCIENCE PERSPECTIVE (3:3:0) An overview of the social sciences, including an interdisciplinary analysis of the urban process.

2. CONTEMPORARY MAN AND SOCIETY (3:3:0) Selected contemporary issues in the perspective of history, sociology, psychology, economics, and political science.

## SOCIAL STUDIES (SO ST)

800. HUMAN CULTURES AND THE INDIVIDUAL (3:3:0) Basic components of human cultures, with emphasis upon specific elements of American culture.

801. CRITICAL AND VISIONARY CONCEPTS OF SOCIETY (3:3:0) Critical and visionary concepts of society from the Renaissance to the present, including major theorists, commentators, and imaginative writers.

## SOCIOLOGY (SOC)

1. INTRODUCTORY SOCIOLOGY (3:3:0) Social structure; basic human institutions; analysis of social processes; major social forces.

3. INTRODUCTORY SOCIAL PSYCHOLOGY (3:3:0) Culture, conduct, and the sociogenesis of behavior.

5. SOCIAL PROBLEMS (3:3:0) Poverty, delinquency, crime; family discord; industrial, race, and nationality conflicts; mental disorders.

7. METHODOLOGY OF SOCIOLOGY (3:3:0) Introduction to the nature, collection, and interpretation of materials used by social scientists in research and publication. Prerequisite: 3 credits in sociology.

## SOLAR TECHNOLOGY (S T)

801. INTRODUCTION TO SOLAR TECHNOLOGY (2:1:2) Introduction to solar technology from the standpoint of history, ecology, and energy.
802. SOLAR COLLECTORS (3:2:2) Analysis and application of air-type and fluid-type solar collectors. Prerequisites: A.E. 803, M.E. 881, and S.T. 801.
803. HEAT STORAGE AND DISTRIBUTION SYSTEMS (3:2:2) Analysis and application of heat storage and distribution systems; layout of systems. Concurrent: S.T. 802.
804. ANALYSIS OF SOLAR HEATING AND COOLING SYSTEMS (3:1:5) Comprehensive analysis and application of solar heating and cooling systems. Calculations and layout. Prerequisites: A.E. 809, S.T. 802, 803.
805. ECONOMICS OF SOLAR TECHNOLOGY SYSTEMS (3:2:2) Economic analyses of active and passive solar heating and cooling systems. Prerequisite: S.T. 801.

## SPEECH COMMUNICATION (SPCOM)

200. EFFECTIVE SPEECH (3:3:0) Introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.  
*Unit A.* Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation.  
*Unit B.* Principles of communication, implemented through group problem solving, with some attention to formal speaking and message evaluation.  
*Unit C.* Principles of communication, implemented through analysis and evaluation of messages, with some attention to formal speaking and group discussion.
280. ORAL INTERPRETATION (3:3:0) Principles of oral interpretation of the printed page with practice in oral reading of poetry, prose, and drama.
330. STUDIO PRACTICUM (1-3) Supervised experience in the arts and crafts of radio and television production. Prerequisite: Sp.Com. 325 or 340.
801. SURVEY OF BROADCASTING (3:3:0) Introduction to broadcasting: history, organization, responsibilities, laws, rules and regulations.
802. RADIO AND TELEVISION ANNOUNCING (3:1:4) The study and application of oral communication techniques for radio and television announcing, including basic operation of related equipment.
803. BASIC WRITING FOR RADIO AND TELEVISION (3:1:4) Techniques of writing for radio and television stations, emphasizing copy and news writing. Prerequisite: Engl. 10.
804. RADIO PROGRAMMING, PRODUCTION, AND PERFORMANCE (3:1:4) Introduction to basic elements of radio programming and production, including developing, producing, and performing in radio announcements and programs. Prerequisites: Sp.Com. 801, 802, 803.
805. TELEVISION PROGRAMMING, PRODUCTION, AND PERFORMANCE (3:1:4) Introduction to basic elements of television programming and production, including developing, producing, and performing in television announcements and programs. Prerequisite: Sp.Com. 804.
830. DIRECTED STUDIES (1-3) Individual or group work in broadcast studies and/or projects for second-year students with specific occupational objectives. Prerequisite: Sp.Com. 805 and sixth-term standing.

## STATISTICS (STAT)

200. ELEMENTARY STATISTICS (4:3:2) Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. Prerequisite: 2 units in algebra.

## COURSE DESCRIPTIONS

### THEATRE ARTS (THEA)

104. PROCESSES OF THEATRE PRODUCTION (3:1:4) The procedures of design, coordination, and execution of scenery, costumes, lighting, and sound for nonprofessional productions.
109. THE DRAMATIC ARTS IN THE MASS MEDIA (3:3:0) The place of television-radio-film drama in our culture; relationship with other art forms; standards of evaluation.
806. INTRODUCTION TO CREATIVE DRAMATICS (3:1:4) Introduction and direct experience in creative dramatics and survey of children's theatre.

### WILDLIFE (WILDL)

801. INTRODUCTION TO WILDLIFE MANAGEMENT (3:3:0) Basic principles of wildlife management. Introduction to general ecology and wildlife population dynamics.
803. ANIMAL IDENTIFICATION (3:2:3) Identification of mammals, birds, reptiles, amphibians and fishes; introduction to their life histories.
804. WILDLIFE MENSURATION (3:2:3) The measurement of animal populations and vegetation samples.
805. FIELD AND LABORATORY TECHNIQUES (3:1:6) Techniques utilized in wildlife research and management; introduction to mapping, photography, census, record keeping and measurement of population structure. Prerequisites: For. 802, Wildl. 801, 803, 804, 812, 814. Concurrent: Wildl. 806.
806. OPERATIONAL PROCEDURES AND EQUIPMENT (2:1:3) Summer camp for operational procedures and the operation and maintenance of wildlife equipment and facilities. Concurrent: Wildl. 805.
807. OUTDOOR RECREATION (3:2:3) Sociology, history, and economics of recreational demand; recreational areas and management procedures.
809. ANIMAL CARE (3:2:3) Care and handling of captive wild animals.
811. AERIAL PHOTO INTERPRETATION (4:2:6) Techniques of photo interpretation; type mapping of wildlife environments; photo censusing of wild animals.
812. WILDLIFE FIELD SURVEYS (3:2:3) Terrestrial measurement, methods of plotting, area determinations, cover, and type mapping.
813. FISHERIES MANAGEMENT FOR TECHNICIANS (3:2:3) Introduction to fisheries management, biology of fishes, aquatic ecology, use and care of equipment, habitat surveys, and management practices.
814. HABITAT MANAGEMENT (3:0:9) Identification, ecological characteristics, manipulation of food and cover plants. Animal needs, range and habitat analysis, and management for wildlife.

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THE PENNSYLVANIA STATE UNIVERSITY  
UNIVERSITY PARK, PA 16802

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16801

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81

**1980-1981**

# **The Pennsylvania State University Bulletin**

## **Associate Degree Programs**





**1980-1981**

# **THE PENNSYLVANIA STATE UNIVERSITY BULLETIN**

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## **ASSOCIATE DEGREE PROGRAMS**

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The Pennsylvania State University, in compliance with applicable federal and state equal opportunity laws and regulations governing affirmative action and nondiscrimination, does not discriminate in the recruitment, admission, and employment of students, faculty, and staff in the operation of any of its educational programs and activities as defined by law. Accordingly, nothing in this publication should be viewed as directly or indirectly expressing any limitation, specification, or discrimination as to race, religion, color, or national origin; or to handicap, age, sex, or status as a disabled or Vietnam-era veteran, except as provided by law. Any inquiries concerning this policy may be directed to the Affirmative Action Officer or to the Vice President for Student Affairs.

### **REGULATIONS SUBJECT TO CHANGE**

The educational process necessitates change. This bulletin must be considered as informational and not binding on the University.

Each step of the educational process, from admission through graduation, requires continuing review and appropriate approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

**THE PENNSYLVANIA STATE UNIVERSITY BULLETIN (USPS 426-680)**

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PENN STATE COLLECTION

# \* UNIVERSITY CALENDAR

## WINTER TERM 1980

### NOVEMBER

- 25 Sunday — Arrival date
- 26 Monday — Orientation and advising
- 27, 28 Tuesday, Wednesday — Registration
- 29 Thursday — Classes begin 8:00 a.m.

### DECEMBER

- 19 Wednesday — Christmas and New Year's recess begins 9:55 p.m.

### JANUARY 1980

- 3 Thursday — Winter term classes resume 8:00 a.m.

### FEBRUARY

- 20 Wednesday — Classes end 9:55 p.m.
- 21-25 Thursday to Monday — Final examinations

### MARCH

- 1 Saturday — Commencement

## SPRING TERM 1980

### MARCH

- 4 Tuesday — Arrival date
- 5 Wednesday — Orientation and advising
- 6, 7 Thursday, Friday — Registration
- 10 Monday — Classes begin 8:00 a.m.

### MAY 17 Saturday — Classes end 12:25 p.m.

- 19-22 Monday to Thursday — Final examinations
- 31 Saturday — Commencement

## SUMMER TERM 1980

- JUNE 8 Sunday — Arrival date
- 9 Monday — Orientation and advising
- 10 Tuesday — Registration
- 11 Wednesday — Classes begin 8:00 a.m.

### JULY 4 Friday — Independence Day Holiday (no classes)+

### AUGUST

- 20 Wednesday — Classes end 9:55 p.m.+
- 21-23 Thursday to Saturday — Final examinations
- 30 Saturday — Commencement

## FALL TERM 1980

### SEPTEMBER

- 2 Tuesday — Arrival date
- 3-5 Wednesday to Friday — Orientation and advising
- 3-5 Wednesday (noon) to Friday — Registration
- 8 Monday — Classes begin 8:00 a.m.

### NOVEMBER

- 15 Saturday — Classes end 12:25 p.m.
- 17-21 Monday to Friday (noon) — Final examinations
- 27 Thursday — Thanksgiving
- 29 Saturday — Commencement

\*This calendar is subject to change without notice. Although the University makes every effort to avoid conflicts with religious holidays in preparing the calendar for an academic year, such conflicts are sometimes unavoidable. When they occur, efforts are made to make special arrangements for the students affected.

+Friday, July 4, 1980 classes will meet on Wednesday, August 20, 1980.

# UNIVERSITY ADMINISTRATION

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## **PENN STATE COMMONWEALTH CAMPUSES**

- \*UNIVERSITY PARK CAMPUS University Park, PA 16802  
Area Code 814 865-4700
- ALLENTOWN CAMPUS Academic Building, Fogelsville, PA 18051  
Area Code 215 285-4811
- ALTOONA CAMPUS Smith Building, Altoona, PA 16603  
Area Code 814 946-4321
- BEAVER CAMPUS Brodhead Road, Monaca, PA 15061  
Area Code 412 775-8830
- \*BEHREND COLLEGE Erie (Station Rd., Wesleyville), PA 16563  
Area Code 814 898-1511
- BERKS CAMPUS R.D. 5, Tulpehocken Road, P.O. Box 2150,  
Reading, PA 19608  
Area Code 215 375-4211
- \*CAPITOL CAMPUS Middletown, PA 17057  
Area Code 717 783-6250
- DELAWARE COUNTY CAMPUS 25 Yearsley Mill Road, Media, PA 19063  
Area Code 215 565-3300
- DuBOIS CAMPUS College Place, DuBois, PA 15801  
Area Code 814 371-2800
- FAYETTE CAMPUS P.O. Box 519, Uniontown, PA 15401  
Area Code 412 437-2801
- HAZLETON CAMPUS Highacres, Hazleton, PA 18201  
Area Code 717 454-8731
- McKEESPORT CAMPUS University Drive, McKeesport, PA 15132  
Area Code 412 678-9501  
Area Code 412 462-6401
- MONT ALTO CAMPUS Mont Alto, PA 17237  
(Waynesboro) Area Code 717 749-3111
- NEW KENSINGTON CAMPUS 3550 7th Street Rd.,  
New Kensington, PA 15068  
Area Code 412 339-7561
- OGONTZ CAMPUS 1600 Woodland Road, Abington, PA 19001  
Area Code 215 886-9400
- SCHUYLKILL CAMPUS State Highway, Schuylkill Haven, PA 17972  
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- YORK CAMPUS 1031 Edgecomb Ave., York, PA 17403  
Area Code 717 771-4586

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\*Upper-division and graduate courses



MAJORS AND CAMPUS LOCATIONS

BACCALAUREATE DEGREE MAJORS

The first two years of nearly all baccalaureate majors are offered at all campuses. Exceptions are baccalaureate majors in Architecture and Landscape Architecture, to which students are admitted only at the University Park Campus.

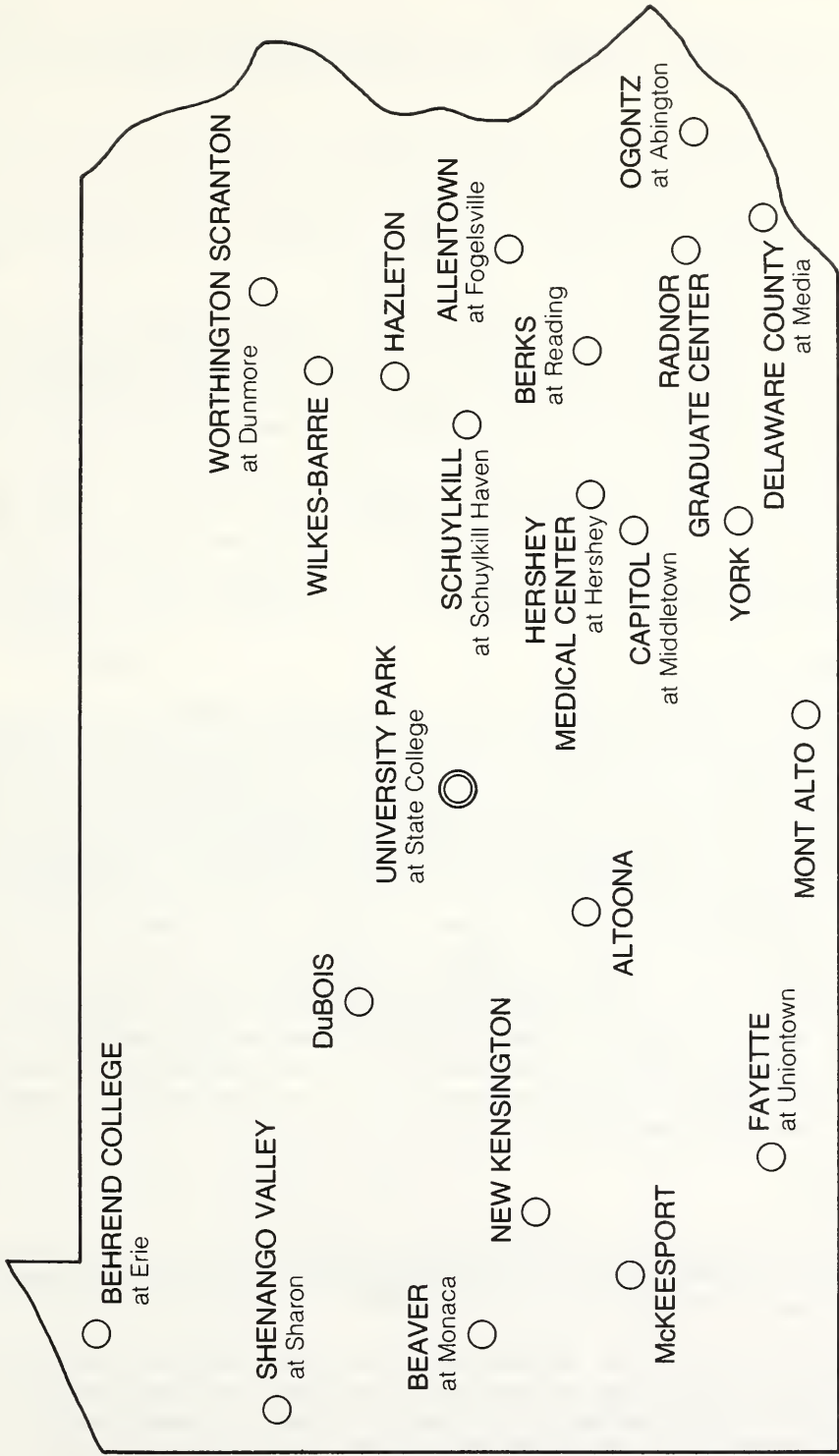
The first two years of nearly all baccalaureate majors are offered at all campuses. Exceptions are baccalaureate majors in Architecture and Landscape Architecture, to which students are admitted only at the University Park Campus.																						
	LOCATIONS	ALLENTOWN	ALTOONA	BEAVER	†BEHREND COLLEGE	BERKS	DELAWARE COUNTY	DuBOIS	FAYETTE	HAZLETON	HERSHEY MEDICAL CENTER	McKEESPORT	MONT ALTO	NEW KENSINGTON	OGONTZ	SCHUYLKILL	SHENANGO VALLEY	UNIVERSITY PARK	**WILKES-BARRE	WORTHINGTON	SCRANTON	YORK
ASSOCIATE DEGREE MAJORS																						
	Agricultural Business (1st yr. only)		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Agricultural Business (2nd yr. only)																					
	Air Pollution Control Engr. Tech. (1st yr.)		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Air Pollution Control Engr. Tech. (1st & 2nd yr.)				•																	
	Architectural Engineering Technology								•								•				•	
	Biomedical Equipment Tech. (1st yr.)		•	•		•	•	•	•	•		•		•	•	•	•	•	•	•	•	•
	Biomedical Equipment Tech. (1st & 2nd yr.)													•					•		•	•
	Business Administration			•	•	•	•	•	•	•				•		•	•				•	•
	Chemical Engineering Technology					•																
	Clinical Health Services										•											
	Community Services (Administration of Justice)*				•	•																
	Computer Science		•	•										•			•				•	•
	Electrical Engineering Technology		•	•		•	•	•	•	•		•		•	•	•	•	•	•	•	•	•
	E.E. Tech.-Telecommunications Option (1st yr.)		•	•		•	•	•	•	•		•		•	•	•	•	•	•	•	•	•
	E.E. Tech.-Telecommunications Option (1st & 2nd yr.)																			•		
	Forest Technology												•									
	Highway Engineering Technology																			•		
	Hotel and Food Service					•																
	Labor Studies*					•	•														•	•
	Letters, Arts, and Sciences*		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Mass Communications — Broadcasting																			•	•	•
	Mass Communications — Journalism						•															
	Mechanical Engineering Technology		•	•	•	•		•	•	•		•		•	•		•		•	•	•	•
	(Drafting and Design Technology)																					
	Medical Laboratory Technology									•												
	Metallurgical Engineering Technology																•					
	Mining Technology (1st yr.)		•							•	•			•		•			•	•	•	•
	Mining Technology (1st and 2nd yr.)									•				•								
	Nuclear Engineering Tech. (1st yr.)		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Nuclear Engineering Tech. (1st & 2nd yr.)		•							•												
	Railway Engineering Technology													•						•		
	Recreation and Parks														•	•						
	Retailing		•																			
	Science			•								•		•			•					
	Science-Radiologic Technologist Radiographer Option													•								
	Sociology*							•		•								•	•		•	•
	Solar Heating and Cooling Technology (1st yr.)								•								•				•	
	Solar Heating and Cooling Technology (1st and 2nd yr.)								•													
	Surveying Technology												•							•		
	Wildlife Technology						•															

\*Community Services (Administration of Justice), Labor Studies, and Sociology are offered as *extended degree programs* for students wishing to pursue part-time (day or evening) study. Letters, Arts, and Sciences may also be taken as an extended degree program at all University locations. Interested students should write to the Undergraduate Admissions Office or the nearest Commonwealth Campus to request a special application form for extended degree programs.

†Four years of some baccalaureate degree majors.

\*\*Four years of all baccalaureate degree majors.

# PENN STATE'S CAMPUS SYSTEM



# THE UNIVERSITY

## MISSION OF THE UNIVERSITY

Penn State's fundamental responsibility is to provide programs of instruction, research, and public service, and thus act as an instrument of self-renewal and development for the Commonwealth. As Pennsylvania's land-grant university, Penn State must preserve and enhance its distinctive qualities.

While the modern university maintains links to the past and serves to maintain cultural values, its most extensive task at present is to help people to understand the great changes taking place in our society. People must have the skills and the learning habits that will make it possible for them to educate themselves over a lifetime. The rapid rate of change in contemporary society dictates that the University's programs adjust without undue delay to meet the needs of students and society.

University programs of research and other creative and scholarly activities are essential if the University is to contribute to the solution of the social, scientific, and technical problems of society and discharge effectively its upper-division and graduate teaching responsibilities. The University must also serve the Commonwealth directly through its programs of extension, continuing education, and other public service programs designed to meet the needs of citizens throughout the state.

By encouraging the enrollment of students from all segments of society and from other states and nations, the University provides the intellectual arena in which the search for rational solutions to societal problems can be nurtured, and in which teaching and learning can be the pivotal function. In performing this function, it is essential that the University foster independent thought and open discussion of alternatives.

## RESIDENT EDUCATION

The undergraduate degree programs of the University provide students with opportunities to increase their knowledge and understanding of the world, and to grow in their individual skills and capabilities for learning, analyzing, judging, creating, and communicating. All undergraduate degree programs and courses offered by the colleges of the University are under the academic sponsorship of a faculty committed to scholarship and are implemented under the academic policies and student rules established by the University Faculty Senate. They are intended to be flexible in accommodating students interested in learning, whether through traditional or non-traditional offerings, while enrolled on either a part-time or a full-time basis. The degree programs and courses of the colleges are offered through University administrative arrangements identified as Resident Education and Continuing Education.

The primary mission of Resident Education is to provide credit courses to degree candidates on University campuses as well as to administer certain off-campus credit-granting activities such as internships, practicums, field trips, and foreign studies. Students not formally admitted to degree candidacy (including provisional and nondegree students) may participate in Resident Education offerings as time and space permit.

## HISTORY

THE PENNSYLVANIA STATE UNIVERSITY, chartered by the Pennsylvania Legislature as the Farmers' High School in 1855, was founded by professional men, educated farmers, and state and county agricultural leaders. A faculty of 4 met the incoming class of 69 students in February 1859.

In May 1862, the institution was renamed the Agriculture College of Pennsylvania, a name which recognized that its work was of collegiate level. Two months later, on July 2, President Abraham Lincoln signed the Morrill Land Grant Act offering each state free public land which it could sell to endow institutions of higher learning where "the leading object shall be, . . . to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

On April 1, 1863, the State Legislature declared that the Morrill Act “is hereby accepted by the State of Pennsylvania with all its provisions and conditions and the faith of the State is hereby pledged to carry the same into effect.” The Legislature then designated Penn State as the land-grant college of the Commonwealth.

The College broadened the scope of its instruction, began to admit women students, increase its enrollment, and enlarge its physical plant. Graduate work was offered as early as 1862. In 1874 the College was renamed the Pennsylvania State College.

In 1953 the name was changed again — to The Pennsylvania State University — in formal recognition of what Penn State had long since become, one of the country’s leading universities. Its ten undergraduate colleges now offer 125 baccalaureate and 29 associate degree majors. In addition, Behrend College, in Erie, offers 16 complete baccalaureate programs. The Capitol Campus, near Harrisburg, offers 11 baccalaureate degree majors. Graduate students may choose from 124 approved fields of study. The College of Medicine, at The Milton S. Hershey Medical Center in Hershey, offers the M.D. degree, the M.S. and Ph.D. in anatomy, biological chemistry, genetics, microbiology, pharmacology, and physiology, the M.S. degree in laboratory animal medicine, and the associate degree in Clinical Health Services.

The original student body of 69 has grown to 59,803, the faculty of 4 to 3,480. Beginning with an educational program which offered 40 courses, Penn State today offers 4,380 undergraduate and 2,130 graduate courses. The University, whose prime purpose has always been to serve the people and the interests of the Commonwealth and the nation, is accredited by the Middle States Association and is a member of the Association of American Universities.

## **ACADEMIC ORGANIZATION OF THE UNIVERSITY**

### **THE COLLEGES**

The University has ten colleges that offer undergraduate majors leading to baccalaureate and associate degrees: College of Agriculture, College of Arts and Architecture, College of Business Administration, College of Earth and Mineral Sciences, College of Education, College of Engineering, College of Health, Physical Education, and Recreation, College of Human Development, College of the Liberal Arts, and College of Science. In addition, Capitol Campus at Middletown and Behrend College at Erie provide an alternative educational setting in which students may enroll in selected degree programs.

### **THE UNIVERSITY SYSTEM OF COMMONWEALTH CAMPUSES**

In addition to the University Park Campus in the Municipality of State College, Behrend College in Erie, and Capitol Campus in Middletown, full-time instruction is available at seventeen Commonwealth Campuses: Allentown, Altoona, Beaver (Monaca), Berks (Reading), Delaware County (Media), DuBois, Fayette (Uniontown), Hazleton, McKeesport, Mont Alto, New Kensington, Ogontz (Abington), Schuylkill (Schuylkill Haven), Worthington Scranton (Dunmore), Shenango Valley (Sharon), Wilkes-Barre, and York.



## TWO-YEAR ASSOCIATE DEGREE MAJORS

The two-year associate degree majors provide concentrated instruction to prepare graduates for specialized assignments in business and industry or to give students a basic two-year education. These majors are offered at Commonwealth Campus locations as listed on page 8 of this bulletin. In addition, the Commonwealth Campuses offer up to two years of work in most of the baccalaureate degree majors offered by the University.

At present the University offers two-year majors in Agricultural Business; Business Administration; Clinical Health Services; Community Services; Computer Science; Forest Technology; Hotel and Food Service; Labor Studies; Letters, Arts, and Sciences; Mass Communications-Broadcasting; Mass Communications-Journalism; Medical Laboratory Technology; Nursing; Recreation and Parks; Retailing; Science; Sociology; Wildlife Technology; and thirteen areas of engineering: Air Pollution Control Engineering Technology; Architectural Engineering Technology; Biomedical Equipment Technology; Chemical Engineering Technology; Electrical Engineering Technology; Highway Engineering Technology; Mechanical Engineering Technology; Metallurgical Engineering Technology; Mining Technology; Nuclear Engineering Technology; Railway Engineering Technology; Solar Heating and Cooling Technology; and Surveying Technology.

A description of the purposes, objectives, and content of each of the two-year majors is given on succeeding pages.

Most of Penn State's associate degree enrollment at present is concentrated in its engineering technology majors. The engineering technology graduate, a specialist in applied rather than theoretical engineering, is equipped to translate creative ideas into new machines, products, structures, and processes. He or she understands the basic scientific principles which are the tools of the graduate engineer and is acquainted with the production tools and materials of this skilled worker.

**STATEMENT OF BASIC ACADEMIC ADMISSIONS POLICIES**—Admission to the University credit courses or degree candidacy at The Pennsylvania State University is governed by policies established by the University Faculty Senate. Although specific applications of these policies may vary from year to year, from location to location, and from program to program, all University admissions are governed by the following general policies:

1. As an institution of higher education, The Pennsylvania State University is committed to making post-high school education available to all who possess a high school diploma or its equivalent without restriction as to race, sex, religion, color, ancestry, national origin, ethnic origin, or handicap or age as provided by law.
2. The primary responsibility of the University is to residents of the Commonwealth of Pennsylvania. Consequently, within limits expressed from time to time by the Board of Trustees of the University, preference shall be given to Pennsylvania residents in the various admission processes.
3. In order to meet the variety of goals and objectives of the population, the spectrum of offerings is designed to enable persons with a variety of objectives — both degree and nondegree — to receive higher education. Although access to educational opportunities of the University is open to all, courses offered for credit are available to those holding a high school diploma or its equivalent. Policies governing admission to degree candidacy are established by the University Faculty Senate (with delegation of policies governing admissions to graduate programs to the Graduate Faculty of the University) under a general policy of offering admissions to those whose past academic performance indicates a reasonable probability of success.
4. Undergraduate students are admitted to either baccalaureate degree candidacy or associate degree candidacy. To be admitted to degree candidacy, the individual must present an academic performance record which indicates a reasonable probability of his or her success in his or her chosen program. In the case of freshman admission to undergraduate degree candidacy, performance is measured through the high school record and standardized test results. In the case of advanced standing admission, performance is measured either through success in non-degree programs and courses of the University or by success at some other institution of higher education.

5. Within the space available in particular programs and at particular locations, admissions shall be offered preferentially to those whose performance record indicates the highest probability of success in the chosen program—with this process continuing until all available spaces are filled. Although exceptions to this policy may be made from time to time (for example, recipients of scholarships with restricting qualifications), these exceptions may be made only for students who meet at least the minimum admission and entrance requirements.

6. If a college requires restrictions on its baccalaureate admissions, the priorities or quotas established must include provisions to consider qualified students in each of these groups:

Admissions Group I—Freshman Admissions: Students who hold a high school diploma or equivalent, who present fewer than 18 credits of baccalaureate work (from The Pennsylvania State University or another accredited institution), who meet minimum college entrance requirements, and who meet minimum college admission standards are considered in this group.

Admissions Group II—Penn State Advanced Standing Admissions: Students who 1) request baccalaureate degree readmission, presenting 18 or more credits; 2) request a change from The Pennsylvania State University associate degree to baccalaureate degree status, presenting 18 or more applicable credits (including Type II, The Pennsylvania State University associate degree graduates); or 3) request a change from The Pennsylvania State University provisional degree to baccalaureate status, presenting 18 or more applicable credits are considered in this group. In all Penn State advanced standing admissions, it is understood that the student must have a G.P.A. of at least 2.0 and meet the minimum entrance and advanced standing requirements of the college.

Admissions Group III—Other Advanced Standing Admissions: Students who 1) request changes from The Pennsylvania State University nondegree to baccalaureate status, presenting 18 or more applicable credits; or 2) have not been students at Penn State and request baccalaureate status at Penn State, presenting 18 or more applicable credits. In all advanced standing admissions it is understood that the student must have a G.P.A. of 2.0 and meet the minimum entrance and advanced standing requirements of the college.

Within these three groups, no special consideration will be given to any group; students will be admitted to the college on the basis of academic competition (e.g., SAT scores, grade-point averages, grades in required courses in the college, and other evidence predictive of baccalaureate degree performance where available, valid, and reliable).

7. To assure a proper educational mix of students and to further broaden the educational opportunities offered by the University, the University Faculty Senate and the University administration may from time to time authorize various specialized programs. These programs may permit students who do not meet the basic qualifications for admission to degree candidacy to be admitted to such candidacy. These programs may also permit, in selected situations, exceptional students who have not earned a high school diploma or its equivalent to enroll in University credit courses. Such specialized programs may include up to 10 percent of the total admission group for the University in any one year and up to a maximum of 15 percent of the admission to any geographic location of the University.

8. Within this general policy, colleges of the University, with the concurrence of the University Faculty Senate, may impose certain educational background requirements (Carnegie Units) which must be completed by an individual before being admitted to degree candidacy.

**ADMISSION REQUIREMENTS—*Freshman Admission***—A person who holds a high school diploma or its equivalent, and who has not taken credit courses at an institution of higher learning, or a person who holds a high school diploma or its equivalent and who has taken less than 18 semester credits at an accredited college or university may be considered for admission as a freshman.

Applicants for admission to all associate degree programs must submit scores of the Scholastic Aptitude Test of the College Entrance Examination Board.

All applications should be addressed to the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802. Telephone: (814) 865-5471.

The University reserves the right to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

An applicant must state in writing whether he has attended any other institution of higher learning, even though advanced standing is not desired. Failure to indicate, at the time of registration, previous registration in another institution invalidates the admission.



## GENERAL INFORMATION

To be admitted to degree candidacy, the applicant must have completed certain education background requirements, called Carnegie Units or secondary school units. To determine whether you have the appropriate secondary school units required for your choice of a program of study, refer to the following page to the program of your choice. Then read across to determine the necessary units.

All students entering an associate degree program are required to pass a basic skills examination in English composition and in mathematics (arithmetic) within the first three terms after they matriculate. Students who are deficient in one or both of the basic skills will be identified in the preregistration testing program prior to enrollment in the first term of their program. Two courses are available to assist the student in passing the basic skills tests; English 4 (3 credits) and Mathematics 0 (3 credits). The examinations will be administered on all campuses during orientation in the summer and during the final examination period at the close of fall, winter, and spring terms. Students may take the examination whether or not they are enrolled in the basic skills courses. They may take the examination without penalty until they pass it but in no case more than four times. Failure to pass it results in the student being dropped from degree status at the end of the third term.

*Admission with Advanced Standing* — An applicant who has acquired at least 18 semester credits at an accredited college or university and has a cumulative grade-point average of at least 2.00 (on a 4.00 scale) for all graded courses at all colleges and universities previously attended may be considered for admission with advanced standing.

The requirements for admission for such a student are the same as for a beginning freshman student as far as the secondary school record is concerned. In all cases where work has been taken at other institutions, an official transcript from each place of attendance must be submitted directly to the Undergraduate Admissions Office by the institutions attended. The latter must include evidence that the student was honorably dismissed and was in good academic standing at the time of leaving.

An applicant meeting the cumulative grade-point average of at least 2.00 (on a 4.00 scale) but not the entrance requirements may enroll in courses as a provisional student (degree-seeking) or as a nondegree student. An applicant not meeting the minimum requirements of a cumulative grade-point average of 2.00 (on a 4.00 scale) may apply to enroll in credit courses as a nondegree student. An applicant enrolling as a provisional or nondegree student must comply with the policy and procedures for students enrolled in these categories.

Associate degree programs have a limit on the number of credits that may be accepted by transfer from accredited institutions. Information on credit limitations may be obtained from the academic official responsible for a particular program. Grades are not transferred with credits from other institutions and do not, therefore, enter the calculation of the term or cumulative average at this University.

*Provisional Student (Degree-Seeking)* — An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admissions as a degree candidate may enroll in credit courses at the University. A provisional student must apply to enroll in courses every term. A provisional student may enroll in credit courses if the following criteria are met:

1. The student is making satisfactory progress towards admission as a degree candidate. Progress is satisfactory if a student has earned 18 credits with a minimum grade-point average of 2.00 (on a 4.00 scale). If a student has earned less than 2.00, the student is given a warning. A student who has earned 27 credits with a grade-point average of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent term. No student, regardless of cumulative grade-point average, who has completed 36 credits will be permitted to enroll as a provisional student in any subsequent term.
2. There is space available after degree candidates have been accommodated.
3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons may petition for an exception to the policy.

## TWO-YEAR ASSOCIATE DEGREE MAJORS

SECONDARY SCHOOL UNITS REQUIRED FOR ADMISSION  
TO ASSOCIATE DEGREE PROGRAMS

	English	Math. (A)*	Math. (B)+	Math. (C)**	Science	Other Subjects	Total
Agricultural Business	3					12	15
Air Pollution Control Engineering Technology	3	2				10	15
Architectural Engineering Technology	3	2				10	15
Biomedical Equipment Technology	3	2				10	15
Business Administration (2-year)	3		2			10	15
Chemical Engineering Technology	3	2				10	15
Clinical Health Services	3			2	2++	8	15
Community Services (Administration of Justice)	3					12	15
Computer Science	3	2				10	15
Electrical Engineering Technology	3	2				10	15
Telecommunications Option	3	2				10	15
Forest Technology	3		2			10	15
Highway Engineering Technology	3	2				10	15
Hotel and Food Service	3					12	15
Labor Studies	3					12	15
Letters, Arts, and Sciences	3					12	15
Mass Communications-Broadcasting	3					12	15
Mass Communications-Journalism	3					12	15
Mechanical Engineering Technology (Drafting and Design Technology)	3	2				10	15
Medical Laboratory Technology	3	2				10	15
Metallurgical Engineering Technology	3	2				10	15
Mining Technology	3	2				10	15
Nuclear Engineering Technology	3	2				10	15
Railway Engineering Technology	3	2				10	15
Recreation and Parks	3					12	15
Retailing	3					12	15
Science (2-year)	3	2				10	15
Radiologic Technologist Radiographer	3	2				10	15
Sociology (2-year)	3					12	15
Solar Heating and Cooling Technology	3	2				10	15
Steel Technology	3	2				10	15
Surveying Technology	3	2				10	15
Wildlife Technology	3		2			10	15

\*Math. (A) requirements may be satisfied by at least 2 units of mathematics: 1 unit of algebra, and 1 additional unit in any combination of advanced algebra, plane geometry, solid geometry, or trigonometry.

+Math. (B) requirements may be satisfied by any 2 units of mathematics, but it is strongly recommended that the 2 units be 1 of algebra and 1 of plane geometry.

\*\*Math. (C) requirements may be satisfied by 1 unit of algebra and 1 additional unit in mathematics.

++Biology and chemistry are recommended.



## GENERAL INFORMATION

Note: An applicant holding a baccalaureate degree or higher is not eligible to enroll as a provisional student. The applicant is referred to the graduate nondegree program.

A provisional student may apply to become an associate degree candidate after completing 9 credits of Penn State course work with a minimum grade-point average of 2.00, satisfying the entrance requirements of the major in which enrollment is desired, and meeting the Basic Skills requirements. After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a provisional student may be used to fulfill the degree requirements.

*Nondegree Student* — An applicant holding a high school diploma or its equivalent may be permitted to enroll in credit courses (either for credit or audit) at the University. A nondegree student, who has not been dropped as a degree or provisional student from the University or any other college or university for poor scholarship, may take at least 8 credits per term. A person dropped as a degree candidate from this University or any other college or university for poor scholarship may take courses as a nondegree student to improve a grade-point average in order to apply for reinstatement as a degree candidate at the University. However, a student so dropped may not register as a nondegree student until one term (excluding summer term) has elapsed from the time of the drop action. Such students may register for six (6) credits per term (8 credits at Capitol Campus) until degree status is attained.

A nondegree student may apply to enroll in courses each term if the following criteria are met:

1. The applicant has completed the prerequisites for the courses to be taken or can present evidence of ability to follow successfully the courses to be taken.
2. There is space available after degree candidates and provisional students have been accommodated.
3. The student has not been dismissed or suspended for nonacademic reasons from any college or university. However, a person who has been dismissed or suspended from another college or university for disciplinary reasons may petition for an exception to the policy.

A nondegree student may apply to become an associate degree candidate after completing 9 credits of Penn State course work with a minimum grade-point average of 2.00, satisfying the entrance requirements of the major in which enrollment is desired, and meeting the Basic Skills requirements. After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a nondegree student may be used to fulfill the degree requirements.

Note: Provisional students (degree-seeking) and nondegree students are subject to the same tuition charges as regular students. The Academic Policies and Procedures approved by the University Faculty Senate apply to provisional and nondegree students as stated.

An individual desiring to take associate degree courses as a provisional student (degree-seeking) or nondegree student should submit the appropriate application for admission. An application form may be obtained from the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802, or from the office of the director of any Commonwealth Campus of The Pennsylvania State University.

**DIVISION OF UNDERGRADUATE STUDIES**—This division is an academic unit which offers the following programs and services:

*Freshman Testing, Counseling, and Advising* for all new freshmen. Results of comprehensive testing are used in individual academic counseling to help evaluate each student's educational objectives and to plan course schedules for the first term.

*Enrollment and Registration.* Students whose interests or career objectives change can request that they be enrolled in 2-DUS (Division of Undergraduate Studies). Specialized academic advising in DUS accompanies students' attendance in regular courses until students choose a new program and meet its academic standards for transfer.

*Academic Advising and Counseling* are available to all students, including provisional students who will eventually seek admission to a degree-granting program.

## TWO-YEAR ASSOCIATE DEGREE MAJORS

*Undergraduate Academic Information* is coordinated and disseminated through DUS to assist with and promote understanding of students' academic advising needs.

**GRADING SYSTEM**—Grades shall be reported by the following symbols: A, B, C, D, and F.

<i>Grade</i>	<i>Quality of Performance</i>	<i>Grade-Point Equivalent</i>
A	Excellent	4
B	Good	3
C	Satisfactory	2
D	Poor	1
F	Failure	0

**GRADUATION REQUIREMENTS**—In order to be graduated, a student must complete the course requirements of the major and earn at least a C average (a grade-point average of 2.00) for all courses.

**DEGREES**—The associate degree majors outlined in this catalog lead to the following degrees: Associate in Agricultural Business, Associate in Business Administration, Associate in Clinical Health Services, Associate in Community Services, Associate in Computer Science, Associate in Engineering, Associate in Forest Technology, Associate in Hotel and Food Service, Associate in Labor Studies, Associate in Letters, Arts, and Sciences, Associate in Mass Communications-Broadcasting, Associate in Mass Communications-Journalism, Associate in Medical Laboratory Technology, Associate in Metallurgical Engineering Technology, Associate in Mining Technology, Associate in Nursing, Associate in Recreation and Parks, Associate in Retailing, Associate in Science, Associate in Sociology, and Associate in Wildlife Technology.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE CAPITOL CAMPUS** — In addition to receiving an education to prepare for employment, the graduate of an associate degree program may also qualify for admission to various programs leading to a baccalaureate degree from Penn State's Capitol Campus. Those anticipating admission to Capitol Campus should inquire at the Capitol Campus Admissions Office late in their freshman year or early in their sophomore year concerning baccalaureate program course requirements.

The following associate programs, with electives in English composition, college algebra, and statistics, are acceptable toward the baccalaureate degree in Business Administration offered at Capitol Campus: Agricultural Business, Business Administration, Computer Science, Hotel and Food Service, Manufacturing Technology, Medical Laboratory Technology, Metallurgical Engineering Technology, and Retailing.

Graduates of the associate programs of Air Pollution Control Engineering Technology, Architectural Engineering Technology, Biomedical Equipment Technology, Chemical Engineering Technology, Electrical Engineering Technology, Highway Engineering Technology, Mechanical Engineering Technology, and Surveying Technology may wish to consider continuing at the Capitol Campus in a program of study in engineering technology leading to a Bachelor of Technology degree.

The following associate degrees are also acceptable toward admission to programs leading to a baccalaureate degree at Capitol Campus: Letters, Arts, and Sciences; Mass Communications-Broadcasting; Mass Communications-Journalism; and Sociology.

## STUDENT WELFARE

**ORIENTATION PROGRAM**—At the opening of the fall term all new students participate in an orientation program. In addition to becoming acquainted with the new environment in which they will live and study, students receive instruction and counseling concerning their courses of study, participation in extracurricular activities, and the cultural opportunities open to them. Registration is also held during this period.

**STUDENT GOVERNMENT**—Representative student leadership is provided on each campus of the University by a student government association, which functions through officers and representatives elected from and by the student body. In addition to their involvement in student programs at their local campuses, student officers and delegates from University campuses convene several times annually. These meetings provide for an exchange of information among the various student government associations and for system-wide coordination in student government and student activities.

**STUDENT CONDUCT**—The University regards as serious offenses all acts of unethical, immoral, dishonest, or destructive behavior, as well as violations of University regulations as set forth in each campus's student handbook and in the *Policies and Rules for Students*, a copy of which is available to each student upon registration.

**INSURANCE PROTECTION WHILE ATTENDING THE UNIVERSITY**—The Pennsylvania State University is an instrumentality of the Commonwealth performing its function of education. It is not liable for the negligence of its officers, servants, and employees when in the exercise of public or governmental powers or in the performance of public or governmental duties incident to the general educational work of the University.

Any student who desires insurance protection while in attendance at the University (1) for accident and health and/or (2) for loss of property by fire or theft should arrange personally for whatever insurance seems desirable through an agency of his or her choice. Accident and health programs are available under the sponsorship of the Undergraduate or Graduate Student Government Organizations.

**STUDENT ACCIDENT / TRIP INSURANCE**—Short term group trip accident insurance is available to students who are not otherwise covered. Students taking course-connected class trips, or taking group trips with a student organization registered with the Office of Student Activities, may obtain around-the-clock coverage for accidental death and dismemberment, as well as accidental medical expenses. This insurance is available for the duration of the trip. Information about obtaining coverage and paying premiums is available from your instructor, campus business office, or the University risk manager.

**HEALTH SERVICES**—The University Health Service assists in promoting and maintaining the health of students.

Every new full-time student must successfully complete a physical examination before being permitted to register for classes at the University.

The health services of the University are made available to students in accordance with a statement provided by each campus, pertinent to that campus, and published in its student handbook.

The University does not obligate itself for payment of medical services other than those provided by personnel employed or retained by the University and in facilities owned or contracted for by the University. Treatment provided in contract facilities must be authorized by the campus director, dean of student affairs, or nurse.

Students are urged to protect themselves against medical expenses that may result from injury or illness by arranging for personal insurance coverage.



**CAREER DEVELOPMENT AND PLACEMENT**—The Career Development and Placement Center assists students in continual evaluation of their educational and career plans as they progress through college and helps them identify sources of personal or academic difficulty which may interfere with their progress. Individual as well as group educational and career counseling programs are available to students.

A Student Affairs staff member at each campus has responsibility for providing placement assistance for associate degree graduates. Services include bringing employers to the campus to interview graduates for permanent employment, providing job information, and assisting students in preparing for job interviewing. The Career Development and Placement Center at the University Park Campus supplies prospective employers (national, state and local) with information concerning the associate degree programs and works cooperatively with the Commonwealth Campuses in assisting graduates to locate suitable employment.

## STUDENT AID

In addition to the student aid information provided below, students may wish to consult the *Student Financial Aid* brochure provided in the Application for Admission packet sent to each applicant. After reviewing the brochure, additional questions should be directed to the Office of Student Aid, 335 Boucke Building, on the University Park Campus, or to the Office of Student Affairs at a Commonwealth Campus.

### AID PROGRAMS AVAILABLE TO ASSOCIATE DEGREE CANDIDATES

#### GRANTS (aid sources not requiring repayment)

*Basic Educational Opportunity Grant (BEOG)*—BEOG is the major federal grant program available to undergraduates. This award is available to undergraduates pursuing their first baccalaureate or associate degree on at least a half-time basis (4 credits per term).

*Pennsylvania Higher Education Assistance Agency Grant (PHEAA)*—This is a grant established by the Commonwealth to assist undergraduates who have a financial need as defined by PHEAA guidelines. Applicants must be residents of Pennsylvania.

NOTE: Non-Pennsylvania students should contact their state higher education assistance agencies for information on state grants available for attending Penn State.

*Supplemental Educational Opportunity Grant (SEOG)*—This grant is available to students with high documented needs. The yearly maximum SEOG is \$1,500 with an overall maximum of \$4,000 for undergraduate study.

#### LOANS

*Guaranteed Student Loan Program (GSL)*—The GSL is a federally-subsidized loan program which offers students attending on at least a half-time basis the opportunity to borrow money for their education. An undergraduate may borrow up to \$2,500 per year with a maximum of \$7,500 for undergraduate studies. The \$25,000 maximum income limit for automatic eligibility for the interest subsidy benefit has been removed. Under the provisions of the Middle Income Student Assistance Act, effective November 1, 1978, the GSL is available on an interest-free basis to all eligible students for the period of enrollment and for the grace period before repayment begins. Repayment begins nine months after the termination of the student's education at an interest rate of 7 percent per year simple interest.

*National Direct Student Loan (NDSL)*—This program provides loans of up to \$1,250 per year with an overall maximum of \$5,000 for undergraduates. Repayment starts nine months after termination of the student's education at an interest rate of 3 percent per year simple interest. Postponement of repayment and loan cancellation may be arranged for certain types of employment following graduation.



## GENERAL INFORMATION

*University Loans*—University loans are funds established by donors to help students who have a documented financial need. These loans are divided into two categories: short-term and long-term.

1. Short-term loans assist students in meeting unanticipated expenses which relate to the acquisition of a college degree. These loans are interest-free and repayable on a short-term basis — 30, 60, or 90 days.
2. Long-term loans help needy students meet the educational and living expenses required to attain a college degree. Repayment starts immediately after the student completes his or her studies at a simple interest rate of 6 percent per year.

## EMPLOYMENT

*College Work Study Program (CWSP)*—The CWSP is a form of federal aid which allows a student to earn a portion of the documented financial need through approved CWSP jobs. This is a nonrepayable source of aid since the student is paid an hourly wage for his or her employment. Earnings from this program when combined with other sources of student aid may not exceed the documented need derived from the Financial Aid Form (FAF).

*Student Employment*—Students who are interested in part-time employment on campus or in the State College area should contact the Student Employment Office, 303 Boucke Building, University Park, PA 16802, or contact the dean of student affairs at Commonwealth Campuses. Earnings from University employment must, according to federal regulations, be considered an aid resource which will be counted toward meeting a student's financial need.

## SCHOLARSHIPS

*University Scholarships*—University scholarships are awarded on the basis of superior high school or college academic performance and in most cases documented financial need. They are awarded either by the scholarship committees in the various academic colleges of Penn State, by the Freshman or Faculty Senate Scholarship Committees, or the Commonwealth Campus Scholarship Committees.

## HOW TO APPLY

After completing the application for admission to the University, each student seeking aid consideration should complete the forms necessary for each aid program being sought.

### I. Aid Awarded/Coordinated by the States

PHEAA grant (Pennsylvania residents only)

Other state grant/scholarship programs

Guaranteed Student Loan

(Undergraduates)

Pennsylvania residents should complete the combined Pennsylvania Higher Education Assistance Agency/Basic Educational Opportunity Grant Application. Students currently receiving PHEAA grants will receive renewal applications by mail from the PHEAA agency. Regular applications are available from high school guidance counselors, the Office of Student Aid, and the dean of student affairs at Commonwealth Campuses in addition to the Pennsylvania Higher Education Assistance Agency. Non-Pennsylvania students should contact their state's Higher Education Assistance Agency for information on aid programs available to them as Penn State students.

(PA and non-PA residents)

Contact a local bank or lending institution for application forms for the Guaranteed Student Loan Program. After completing the forms, submit them to the Office of Student Aid, 335 Boucke Building, University Park, PA 16802, along with a stamped envelope addressed to the lender.

## II. Aid Awarded by the Federal Government

### BEOG

(All undergraduate students)

Students who have completed the Financial Aid Form (FAF) or the PHEAA grant application are automatically considered for the BEOG program. Students who have not filed the FAF or PHEAA grant application should complete the BEOG application. After receiving the Student Eligibility Report (SER), which designates eligibility for a BEOG, follow the instructions contained on the SER to finalize the award. Applications are available from high school guidance counselors, the Office of Student Aid, or the dean of student affairs at Commonwealth Campuses.

## III. Aid Awarded by The Pennsylvania State University

Supplemental Educational Opportunity Grant (SEOG)

National Direct Student Loan (NDSL)

College Work Study Program (CWSP)

University loans and scholarships

(All students)

Complete the Financial Aid Form (FAF) or the State Grant/Basic Grant application. File by Feb. 15

Note: The FAF or the State Grant/Basic Grant application is the only form necessary for the entering freshman to complete to be considered for the above aid sources. Both forms are available from high school guidance counselors, the Office of Student Aid, and the dean of student affairs at Commonwealth Campuses. The recommended filing date for early consideration is February 15; however, students are encouraged to submit applications at any time during the year.

(All students except entering freshmen)

Complete the Office of Student Aid's Financial Aid Application. Students may indicate on this application the type of aid they are seeking, with the exception of University scholarships. File by April 1. The application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

(All students except entering freshmen)

Complete the University Scholarship Application. Since funds are limited, applications are only encouraged from those students with a cumulative grade-point average of 3.0 or higher. File by Feb. 15. This application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

## IV. Private Aid Sources

All students are urged to explore local scholarship/grant opportunities as well as any private low-interest loan funds offered by local employers and civic organizations.

## HOW MUCH DOES IT COST TO ATTEND PENN STATE?

One of the major concerns of students and their parents is knowing how much it will cost to attend Penn State for an academic year. The following itemized listing of expenses, although prepared for the 1979-80 academic year, may be used as a basic guide for your planning. Students may find that some of the costs vary according to individual needs and circumstances.

## GENERAL INFORMATION

### ESTIMATED STUDENT BUDGETS — 1979-80

	<i>Residence Halls or Off-Campus Housing (All Campuses)</i>	<i>Living at Home</i>
Commonwealth Campus Tuition (including Behrend College)	\$1,281*	\$1,281*
Room & Board	1,665	1,137
Books & Supplies	240	240
Clothing & Laundry, Transportation, Personal Maintenance, Medical, & Recreation	<u>1,383</u>	<u>1,590</u>
Total*	\$4,569	\$4,248

\*For non-Pennsylvania residents the non-resident undergraduate tuition figure of \$2,982 should be substituted. The total estimated budget for an out-of-state undergraduate student at University Park Campus is \$6,270.

The 1979-80 tuition at University Park is \$1,485.

### STUDENT RIGHTS AND RESPONSIBILITIES

The Office of Student Aid at Penn State administers and coordinates the aid programs according to applicable federal and state regulations and University policies which guarantee each student equal access to financial assistance. The Office of Student Aid employs the standard need analysis services of the College Scholarship Service to assess the aid eligibility of student applicants, ensuring equity of treatment among all applicants. The University does not discriminate on the basis of race, creed, color, national origin, handicap, age, or sex in any of its policies, practices, or procedures.

Eligibility for aid is contingent upon the student's financial need for assistance to meet educational costs. Each program has specific eligibility requirements which must be met before funds are awarded. In addition to financial need as a criterion for receiving aid, a student must be enrolling as a degree or provisional student. Nondegree students are not eligible to receive aid at Penn State. The University may require an official copy of the Federal Income Tax Form 1040 to verify eligibility for aid.

Satisfactory academic progress must be maintained for continued consideration for assistance. Although satisfactory progress is generally measured by institutional standards, certain aid programs have additional expectations which must be met for continued support. The student is encouraged to carefully read all aid application materials for further information about maintaining eligibility.

The Office of Student Aid assumes that all aid applicants will keep apprised of all application deadlines pertaining to the aid sources they are seeking. Because limited funds are available, applications filed after the applicable deadline dates are considered only as funds permit. On-time applicants receive first consideration. Some aid programs have flexible application deadlines which permit students to receive consideration at most times during the year (for example, the GSL and BEOG programs). Current and prospective aid recipients are strongly encouraged to keep well-informed of aid application procedures through aid publications, news media, and agencies providing aid information such as the Office of Student Aid at University Park and the Office of Student Affairs at Commonwealth Campuses.

Aid is never automatically awarded for subsequent years. Students must reapply each year for funds. Students who plan to attend the summer term must file separate applications to be considered for almost all aid programs. The major exceptions to this requirement are as follows:

1. Entering freshmen seeking aid awarded by the University (see "How to Apply" above) must file only the FAF to receive consideration for the summer term if they have been admitted to the University specifically to begin during the summer term; and



## TUITION, ROOM, BOARD, AND OTHER CHARGES

2. The BEOG program has no separate summer application and is generally awarded to students during the fall-winter-spring academic year. (BEOG recipients not attending the entire fall-winter-spring year should contact the Office of Student Aid to determine if a summer payment is possible.)

One of the goals of the Office of Student Aid is to help financial aid recipients receive a financial aid package which will meet the students' documented financial need. The financial aid package can be composed of federal aid, state grant monies, private award sources, or any other source of funds available to the student, including earnings from University employment.

It is the responsibility of the Office of Student Aid, however, to assure the Federal Government that federal aid recipients will not be permitted to retain financial aid *exceeding* the students' need. Although repayment was necessary for fewer than one percent of Penn State students in the previous year, students should be aware that if the aid received is in excess of need, they will be notified of their responsibility to return the excess amount to the University.

## TUITION, ROOM, BOARD, AND OTHER CHARGES

*NOTE: The University reserves the right to revise tuition, room, board, and other charges without further notice. Tuition and charges for baccalaureate and graduate programs are listed separately in the Baccalaureate Degree Programs, Graduate Degree Programs, and Capitol Campus catalogs. Penn State has four ten-week terms each year. Students normally attend three terms per year.*

**TUITION**—Tuition per term for associate degree students:

	<i>Pennsylvanians</i>	<i>Non-Pennsylvanians</i>
8 or more credits;		
University Park Campus	\$495	\$994
Other Commonwealth Campuses	427	994
7 or fewer credits:		
University Park Campus—rate per credit	62	125
Other Commonwealth Campuses— rate per credit	47	125

**Enrollment Charge**—All entering students who plan to enroll for 8 or more credits are required to pay a nonrefundable enrollment charge of \$52 upon acceptance of an offer of admission.

**General Deposit**—All full-time undergraduate students are required to make a general deposit of \$50 at the time of admission. This deposit will serve to safeguard the property and equipment used by students in their course of study. It will be retained until a student withdraws or is graduated.

The deposit, less any charges for equipment damages, losses, and forfeitures, will be refunded early in the subsequent term to the student who has withdrawn or been graduated. The refund will be made by check and mailed to the student's home address. If at any time the balance of the deposit falls below the minimum amount of \$15, the deposit must be replenished.

**Credit by Examination**—A charge of \$15 per credit is made for credit by examination. For evaluation of credits completed elsewhere a charge of \$20 is made for those applying for admission and a charge of \$3 for those who are already matriculated.

**Student Activities**—Student activities charges are determined by elected representatives of the student body, together with a faculty representative.

**Change of Schedule Charge**—Unless a change is necessitated by the University, a charge of \$6 is made for each change of schedule.

**Late Registration Charge**—Unless the delay is unavoidable, \$10 is charged a student who fails to register on the appointed day.

**Other Expenses**—Books and supplies must be secured by the student. These vary from approximately \$75 per term, depending upon the program.



## GENERAL INFORMATION

**TERMS OF PAYMENT**—Tuition and charges, including room and board, are due and payable in advance of each term at the Office of the Bursar, 103 Shields Building, University Park, PA 16802. Registration for courses may not be completed until tuition and charges are paid.

Approximately six weeks in advance of each term, the University will mail to each continuing and newly admitted student of record an estimated bill for tuition and, where applicable, residence hall charges. Payment by mail is encouraged before the established deadline. The receipt is returned to the student by mail and will permit registration for the designated number of credits. This receipt is likewise authorization to obtain, where applicable, the residence hall key and meal ticket. If checks tendered for payment of tuition and charges are not paid upon presentation to the maker's bank, the student will automatically incur the late payment fee of \$25, and the receipt previously mailed will be considered null and void.

Any student who does not fulfill payment of obligations by the deadline established may be charged the late payment fee of \$25. This charge for late payment also applies to unpaid student supplemental charges. Students whose accounts are delinquent for more than ten days are subject to suspension from the University.

**WITHDRAWALS AND REFUNDS**—In the event of withdrawal, charges for tuition will be refunded under the following policy:

Refund of 80 percent upon withdrawal before the end of the first week of the term (seventh consecutive calendar day from the first day of classes) and a decrease of 20 percent for each week thereafter up to and including the fourth consecutive calendar week. No amount will be refunded for withdrawal after the fourth consecutive calendar week of the term.

Students whose reduction in credits results in fewer than 8 credits will receive refunds of tuition for credits dropped on the basis of these policies.

Any refund policy related to adjustments in room and board will be a part of the housing contract.

## MAJORS

### GENERAL DEGREE REQUIREMENTS

There are a number of areas in which a certain level of competence is expected of all recipients of associate degrees. Therefore, all associate degree programs of the University demand the satisfactory completion of the following requirements:

- 3 credits in the social sciences
- 3 credits in the arts and humanities
- 3 credits in English
- 3 credits in speech communication
- 6 credits in the physical sciences, biological science, or mathematics
- 3 credits in general education electives\*

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\*If the student has not had courses in all three areas of physical science, biological science, and mathematics either in high school or in his or her associate degree program, these three "general education" credits must be used to remedy this deficiency. Otherwise, they may be in any of the areas listed above.

**RESERVATIONS**—The University reserves the right to make such program or class changes as may become necessary because of insufficient enrollment or other contingencies. The University also reserves the right to make any necessary changes in tuition and charges without prior notice. Courses and programs described and listed in this catalog are also subject to change without notice.

AEROSPACE ENGINEERING TECHNOLOGY

This major prepares students for careers as supportive personnel in the aerospace field. Graduates will work as designers and laboratory technicians in the areas of aircraft and missile structures, aerodynamics, and propulsion.

To graduate, 73 credits are required.

FIRST TERM		SECOND TERM	
E.G. 1, Engineering Drawing	Credits 2	Cmp. Sc. 1, Basic Computer Programming	Credits 1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 12, Spatial Analysis	2
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	12		12
THIRD TERM		FOURTH TERM	
Aersp. 800, Applied Aerodynamics	Credits 3	Aersp. 803, Technical Aerodynamics	Credits 3
Aersp. 806, Computer Applications to Aerospace Engineering	3	Aersp. 809, Aerospace Laboratory	2
E.Mch. 811, Elementary Mechanics	3	E.E. 800, Applied Electricity	2
Math. 803, Technical Calculus	3	E.Mch. 813, Strength and Properties of Materials	3
	12	I.E. 811, Manufacturing Materials and Processes	3
			13
FIFTH TERM		SIXTH TERM	
Aersp. 802, Aircraft Structural Analysis	Credits 3	Aersp. 807, Aircraft Structural Design	Credits 3
Aersp. 804, Aircraft Propulsion	3	Sp.Com. 200, Effective Speech	3
Aersp. 808, Electronic Instrumentation	3	Humanities selection	3
Social science selection	3	Technical selection	3
	12		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## AGRICULTURAL BUSINESS

This major prepares students for service in commercial farming and businesses which serve agriculture. The latter includes businesses which process and market farm products, as well as those which provide farmers with all kinds of production supplies, such as feeds, fertilizers, chemicals, biological products, and machinery. Training is also provided in agricultural business organization, management, and sales. This basic program is supported with courses in crop and livestock production and in agricultural engineering.

To be eligible to receive the associate degree, a student must have completed the prescribed major of 62 credits. The first three terms are offered at selected Commonwealth Campuses. The last three terms are offered at the University Park Campus.

FIRST TERM		SECOND TERM	
Acctg. 801, Introductory Accounting; or Acctg. 101, Introductory Financial Accounting	3	Biological science selection	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	B.Law 843, Introduction to Business Law; or B.Law 243, Legal Environment of Business	3
Social science selection	3	Engl. 20, Composition and Rhetoric II; or selection	3
	9	Sp.Com 200, Effective Speech	3
			12
THIRD TERM		FOURTH TERM	
Chem. 11, Introductory Chemistry	3	Ag.E. 800, Farm Power	2
Humanities selection	3	Ag.E. 801, Farm Structures and Utilities	3
Elective	3	Ag.Ec. 803, Introduction to Agricultural Business	3
	+9	Elective	3
			11
FIFTH TERM		SIXTH TERM	
Ag.Ec. 2, Marketing	3	Ag.Ec. 6, Farm Management	3
A.I. 800, Livestock Production	2	Ag.Ec. 800, The Agricultural Economy	3
Pty.Sc. 801, Poultry Production	2	Plt.Sc. 801, Production of Horticultural Crops	3
D.Sc. 802, Dairy Production	2	Plt.Sc. 802, Use of Agricultural Chemicals	3
Agro. 800, Field and Forage Crop Production	3		
	+12		12

\*Students will be placed in Engl. 4 or Engl. 10 on the basis of English Placement Test scores.

+A student may schedule up to 12 credits in these terms. If additional credits are scheduled, suggested courses are mathematics, economics, business management, or biological science.



AIR POLLUTION CONTROL ENGINEERING TECHNOLOGY

This major prepares students for positions as air pollution control technicians, working for a local, state, or federal agency. Technicians may be responsible for the calibration, installation, and operation of air sampling and monitoring equipment, investigation of complaints, plant inspections, and source evaluation. As an industrial air pollution control technician, these same responsibilities may be required with the addition of evaluation and monitoring of gas cleaning equipment and performance.

To graduate, 71-72 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or		Cmp.Sc. 1, Basic Computer Programming	1
Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3		
	12		11
THIRD TERM	Credits	+FOURTH TERM	Credits
Chem. 13, Chemical Principles	3	Chem. 23, Introduction to Modern Analytical Chemistry	4
Chem. 15, Experimental Chemistry	1	E.E. 801, Fundamentals of D.C. Circuits	3
Math. 803, Technical Calculus	3	E.Mch. 810, Basic Mechanics, or E. Mch. 811, Elementary Mechanics	2-3
Sp. Com. 200, Effective Speech	3	Phys. 150, Technical Physics	3
Social science selection	3		
	13		12-13
FIFTH TERM	Credits	SIXTH TERM	Credits
Ch.E. 802, Chemical Technology	3	E.E. 814, Electrical Circuits	4
Ch.E. 830, Industrial Chemistry	3	E.E. 818, Electrical Circuits Laboratory	1
E.E. 809, D.C. Circuits Laboratory	2	M.E. 882, Air Resource Management	2
Humanities selection	3	M.E. 884, Sampling and Monitoring Program	2
	11	Meteo. 303, Introductory Meteorology	3
			12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.  
+Second year to be taken at Berks Campus.

## ARCHITECTURAL ENGINEERING TECHNOLOGY

This two-year program is designed to provide technically trained personnel between the level of high school graduate and professional architectural engineer or architect to support the architectural design and construction industries. Architectural engineering technicians work under the supervision of a graduate architect or architectural engineer. They translate sketches and design concepts into working drawings and renderings. To do so, they need basic skills in structural and environmental systems design and layout, knowledge of building materials and equipment characteristics and performance, as well as the training in drafting techniques required for the realization of final drawings.

The graduates of this major are prepared for employment in architectural, building engineering, or industrialized housing firms. To graduate, 71-72 credits are required.

FIRST TERM		SECOND TERM	
A.E. 801, Building Materials	Credits 3	A.E. 802, Methods of Construction	Credits 3
E.G. 3, Architectural Graphics	2	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Math. 802, Technical Mathematics	3
Engr. 2, Engineering Orientation	1	Phys. 150, Technical Physics	3
Math. 801, Technical Mathematics	3		
	<hr/> 12		<hr/> 12
THIRD TERM		FOURTH TERM	
A.E. 803, Plumbing and Fire Protection	Credits 3	A.E. 804, Heating, Ventilating and Air Conditioning Layout	Credits 3
E.Mch. 811, Elementary Mechanics	3	A.E. 814, Steel Construction	3
Math. 803, Technical Calculus	3	Cmp.Sc. 101, Introduction to Algorithmic Processes	3
Phys. 151, Technical Physics	3	Social science selection	3
	<hr/> 12		<hr/> 12
FIFTH TERM		SIXTH TERM	
A.E. 812, Building Lighting and Electrical Layout	Credits 3	A.E. 807, Advanced Construction Methods	Credits 3
A.E. 815, Concrete Construction	3	A.E. 810, Architectural Engineering Office Practice	3
Sp.Com. 200, Effective Speech	3	Humanities selection	3
Technical selection	2-3	Technical selection	3
	<hr/> 11-12		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

ASSOCIATE DEGREE MAJORS

BIOMEDICAL EQUIPMENT TECHNOLOGY

This major prepares students for careers as biomedical equipment technicians, men and women responsible for specifying, calibrating, maintaining, and replacing clinical electronic equipment used in patient care. Modern health care facilities now have complex electronic instrumentation and apparatus located in virtually every diagnostic and patient treatment area. While these innovations result in improved patient care, they also require extensive maintenance procedures, new equipment calibration, complex servicing and repair, as well as attention to patient and operator safety. To graduate, 75 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 5, Experimental Methods for Engineers; or if not available, Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		
	12		

THIRD TERM	Credits	FOURTH TERM	Credits
Cmp.Sc. 1, Basic Computer Programming	1	Biol. 41, Physiology	3
E.E. 814, Electrical Circuits	4	Chem. 11, Introductory Chemistry	3
E.E. 818, Electrical Circuits Laboratory	1	E.E. 807, A.C. and Electronics Laboratory	2
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II;		E.E. 810, Fundamentals of Semiconductors	3
or Engl. 826, Report Writing	3		
Math. 803, Technical Calculus	3		11
	12		

FIFTH TERM	Credits	SIXTH TERM	Credits
B.E.T. 801, Physiological Transducers	3	B.E.T. 802, Biomedical Instrumentation and Systems	3
E.E. 816, Linear Electronic Circuits	3	B.E.T. 804, Medical and Clinical Equipment	3
E.E. 821, Linear Electronics Laboratory	1	Humanities selection	3
Sp.Com. 200, Effective Speech	3	Technical selection	3
Social science selection	3		
	13		12

SEVENTH TERM (SUMMER)	Credits
B.E.T. 803, Biomedical Equipment Laboratory (Internship)	4

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## BUSINESS ADMINISTRATION

This two-year, college-level academic program is designed to provide instruction in business administration that fulfills the requirements of various levels of responsibility higher than that held by high school graduates.

The primary objective of this major is to provide a managerially oriented program with sufficient communicative and mathematical skills, socially relevant course work, and advanced courses in specific business specialties to develop a well-rounded graduate. To graduate, 68 credits are required.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	12
*Engl. 4, 10, 826; Sp.Com. 200	
B. Social sciences, humanities	9
History, humanities, political science, psychology, sociology selection	
C. Physical education	2
II. Requirements for the Major (45 credits)	
A. General	30
Econ. 2 or 4; Computer Science; Math. 800 or 17; Acctg. 801, 802; B.Law 843; Fin. 807; Mgmt. 800; Mktg. 800; Q.B.A. 101 or 801	
B. Specialization	15
Students will select five courses from the following list according to their area of specialization: Acctg. 803, 806, 807; B.A. 803; B.Law 850; B.Log. 102, 104, 206; Fin. 108, 210; Ins. 800, 810, 820, 830; I.B. 862; Mktg. 801, 802, 803, 804, 805, 806, 807; Mgmt. 801, 802; Q.B.A. 102; R.Est. 800, 810, 830	

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\*Students will be placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students not required to take Engl. 4 will take Engl. 20.



**CHEMICAL ENGINEERING TECHNOLOGY**

This major prepares graduates for positions as assistants to chemists and chemical engineers, assistants in research and control laboratories, and trainees for future supervisory positions in manufacturing and production.

It provides the training necessary for such positions, including a reasonable proficiency in basic sciences, mathematics, communication skills, and the basic principles of chemical engineering technology.

To graduate, 71-72 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3-4
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Cmp.Sc. 1, Basic Computer Programming	1
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	<hr/> 12		<hr/>
			11-12
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Ch.E. 830, Industrial Chemistry	3	Ch.E. 800, Technical Calculations	3
Chem. 13, Chemical Principles	3	Chem. 23, Introduction to Modern Analytical Chemistry	4
Chem. 15, Experimental Chemistry	1	Phys. 150, Technical Physics	3
Math. 803, Technical Calculus	3	Humanities selection	3
Sp.Com. 200, Effective Speech	3		<hr/>
	<hr/> 13		13
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Ch.E. 802, Chemical Technology	3	Ch.E. 803, Chemical Technology	3
Chem. 34, Organic Chemistry	3	Ch.E. 820, Chemical Technology Laboratory	4
Phys. 151, Technical Physics	3	Technical selection	3
Social science selection	3		<hr/>
	<hr/> 12		10

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## CLINICAL HEALTH SERVICES

The objective of this program is to train students to assist the primary care physician in providing health care to patients with a wide variety of problems. The training for the physician's assistant consists of three twelve-week terms in basic and clinical sciences, conducted at the Hershey Medical Center campus, and three twelve-week terms in a primary care setting. Upon completion, the student may take the National Certification Examination for Physician's Assistants.

This program has special admission requirements. For more information write to The Milton S. Hershey Medical Center, 500 University Drive, Hershey, PA 17033.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Engl. 10, Composition and Rhetoric I	3	Sp.Com. 200, Effective Speech	3
P.A. 800, Mechanisms of Body Function I	2	P.A. 801, Mechanisms of Body Function II	2
P.A. 805, Microbiology	2	P.A. 811, Human Behavior II	2
P.A. 810, Human Behavior I	2	P.A. 821, Patient-Oriented Care II	2
P.A. 820, Patient-Oriented Care I	1	P.A. 831, Medical/Surgical Problems II	2
P.A. 830, Medical/Surgical Problems I	2	P.A. 850, Therapeutics	2
P.A. 840, Diagnostics	1	P.A. 807, Genetics	1
	<hr/> 13		<hr/> 14
 THIRD TERM	 <i>Credits</i>	 FOURTH TERM	 <i>Credits</i>
Human. 101, Science and Human Values	3	P.A. 880, Practicum In Primary Health Care Delivery I	10
P.A. 802, Mechanisms of Body Function III	2		<hr/> 10
P.A. 822, Patient-Oriented Care III	2		
P.A. 832, Medical/Surgical Problems III	2		
P.A. 860, Emergency Medicine	2		
P.A. 879, Pediatrics	2		
	<hr/> 13		
 FIFTH TERM	 <i>Credits</i>	 SIXTH TERM	 <i>Credits</i>
P.A. 881, Practicum In Primary Health Care Delivery II	10	P.A. 882, Practicum In Primary Health Care Delivery III	10
	<hr/> 10		<hr/> 10

## COMMUNITY SERVICES

The Community Services major is designed to provide entry-level professional competency in one of several human service fields. The objective of the Administration of Justice emphasis is to provide a general education background, a knowledge base in human development, and a core of professional skills.

The Administration of Justice emphasis educates and upgrades career personnel in police departments, probation and parole agencies, and correctional institutions. Challenges and problems in law enforcement, current approaches and alternatives for crime control, prevention, and rehabilitation are studied. The program includes one term of field experience in a local community agency. To graduate, 62 credits are required.

### *The Administration of Justice Emphasis*

	<i>Credits</i>
I. General Education Requirements (21 credits)	
A. Communication skills	
Engl. 10, 20; Sp.Com. 200	9
B. Biological and physical sciences	
A minimum of 3 credits in each area	6
C. Arts and humanities	3
D. Social and behavioral sciences	3
II. Requirements for the Major (41 credits)	
A. General requirements	
Adm.J. (Com.D.) 7, H.Dev. 100, I.F.S. 129	7
B. Requirements for Administration of Justice emphasis	34
H. Dev. 321 (12)*, or Adm.J. 321 (8) plus 4 additional credits of approved professional electives; Adm.J. 111 and 221, plus 16 credits of professional electives with consent of adviser.	

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\*Guidelines for Field Placement include:

1. Agencies utilized are local agencies.
2. Priority for placement is made for students with higher term standings.
3. Prerequisites for placement include Adm.J. (Com.D.) 7, and Adm.J. 111.

## COMPUTER SCIENCE

The primary objective of this program is to prepare graduates for immediate and continuing employability as application programmers, associate systems designers, or associate systems programmers.

To meet this objective the program is designed to ensure a thorough knowledge of the techniques of programming general-purpose digital computers, and includes extensive practice — using contemporary programming technologies — in the analysis, organization, validation, and documentation of effective computer code. The program also includes practical knowledge of the logical organization of modern digital computers and related peripheral equipment, the structure of operating systems and compilers, and considerations in the design of information systems.

The General Education Requirements provide the student with an extension to the basic educational foundation. The Requirements for the Major give the graduate technical competence in the computing and data processing field. The Application Specialization provides a practical knowledge of a minor or application field within which the graduate may profitably utilize the acquired computing talent. To graduate, 63 credits are required.

### *Scheduling Recommendation by Term Standing*

	1-3	4-6
I. General Education Requirements (29 credits)		
A. Communication skills (9 credits)		
English selections (6)	x	—
Sp.Com. 200 (3)	—	x
B. Mathematics and statistics (12 credits)		
Math. 17 (3), 18 (3)	x	—
Mathematics selection (3)	x	—
Quantitative business analysis or statistics selection (3)	—	x
C. Social science, arts, humanities (6 credits)		
Social science selection (3)	x	x
Arts and humanities selection (3)	x	x
D. Physical education (2 credits)		
Physical education selections	x	—
II. Requirements for the Major (34 credits)		
A. General (22)		
Cmp.Sc. 101, 102, 140 (9)	x	—
Cmp.Sc. 804 (1)	x	—
Cmp.Sc. 44, 54, 64 (9)	—	x
Cmp.Sc. 805 (3)	—	x
B. Application Specialization (12 credits)		
Related course work in an area of computer application— to be approved by the student's adviser. These courses may be chosen from areas such as accounting, retail operations, general business, mathematics, general science, environmental resources, etc., and are selected from the courses offered at the student's campus.	x	x



ASSOCIATE DEGREE MAJORS

ELECTRICAL ENGINEERING TECHNOLOGY

This major is designed to prepare graduates for technological service with electrical utilities, manufacturers of electrical and electronic equipment, and electrical maintenance and instrument departments of various industrial concerns. The principal objective is to provide a practical knowledge of electrical machinery and its control, as well as of electronic theory and its application in communication and control systems.

To graduate, 74-75 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		
	<hr/>		<hr/>
	12		11

THIRD TERM	Credits	SUMMER TERM	Credits
Cmp.Sc. 1, Basic Computer Programming	1	E.E. 813, Fundamentals of Electrical Machines	3
E.E. 814, Electrical Circuits	4		
E.E. 818, Electrical Circuits Laboratory	1		
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3		
Math. 803, Technical Calculus	3		
	<hr/>		
	12		

FOURTH TERM	Credits	FIFTH TERM	Credits
E.E. 804, A.C. Circuits	2	E.E. 815, A.C. Machinery and Control	3
E.E. 807, A.C. and Electronics Laboratory	2	E.E. 817, Advanced Electronics	4
E.E. 810, Fundamentals of Semiconductors	3	E.E. 819, A.C. Machinery Laboratory	1
E.Mch. 810, Basic Mechanics	2	E.E. 820, Advanced Electronics Laboratory	1
Social science selection	3	Sp.Com. 200, Effective Speech	3
	<hr/>		<hr/>
	12		12

SIXTH TERM	Credits
E.E. 811, Microprocessors	3
E.E. 816, Linear Electronic Circuits	3
E.E. 821, Linear Electronics Laboratory	1
Humanities selection	3
Technical selection	2-3
	<hr/>
	12-13

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

# FOREST TECHNOLOGY

The objectives of this major are to train students in the techniques that are basic to planning, organizing, directing, and managing forestry enterprises and to provide a program of general studies which will serve as a foundation for future intellectual growth. It is intended that graduates will act in a supporting capacity to professional foresters.

To be eligible to receive the degree of Associate in Forest Technology, a student must have completed the prescribed major of 69 credits.

<b>FIRST TERM</b>	<i>Credits</i>	<b>SECOND TERM</b>	<i>Credits</i>
*Engl. 10, Composition and Rhetoric I	3	For. 806, Forest Inventories	3
For. 203, Dendrology	2	For. 815, Forest Surveying I	3
For. 804, Forest Mensuration	3	For. 825, Harvesting Techniques	1
For. 824, Introduction to Harvesting	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3		<hr/>
	<hr/>		10
	12		
 <b>THIRD TERM</b>	 <i>Credits</i>	 <b>SUMMER TERM (Freshmen)</b>	 <i>Credits</i>
For. 240, Silvicultural Practices	3	For. 819, Southern Forest Study Tour	1
For. 816, Forest Surveying II	3		
For. 826, Reforestation and Intermediate Operations	1		
Humanities selection	3		
	<hr/>		
	10		
 <b>FOURTH TERM</b>	 <i>Credits</i>	 <b>FIFTH TERM</b>	 <i>Credits</i>
For. 220, Forest Ecosystem Protection	3	For. 241, Aerial Photo Interpretation	4
For. 221, Forest Fire Technology	1	For. 809, Forest Valuation	3
For. 242, Elements of Project Supervision in Forestry	3	Sp.Com. 200, Effective Speech	3
For. 807, Forest Recreation; or For. 810, Forest Improvements; or For. 817, Urban Forestry	3	Social science selection	3
For. 814, Forestry Leadership Practicum	1		<hr/>
	<hr/>		13
	11		
 <b>SIXTH TERM</b>	 <i>Credits</i>	 <b>SUMMER TERM (Sophomores)</b>	 <i>Credits</i>
Acctg. 16, Introductory Accounting Survey	3	For. 820, Advanced Forest Measurements	1
Engl. 826, Report Writing	3	For. 821, Field Studies in Ecology	1
For. 807, Forest Recreation; or For. 810, Forest Improvements; or For. 817, Urban Forestry	3	For. 822, Forest Management Systems	1
	<hr/>		<hr/>
	9		3

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\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10.

# HIGHWAY ENGINEERING TECHNOLOGY

This major prepares highway construction technicians to perform many of the planning and design tasks necessary in the construction of highways, railroads, bridges, viaducts, and airfields. In the planning stages of construction a highway construction technician may be engaged in estimating costs, purchasing materials, preparing specifications, computing fills, cuts, drainage requirements, drafting, designing, or surveying. During actual construction, such technicians may perform supervisory functions and inspection.

To graduate, 73 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	E.Mch. 810, Basic Mechanics	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 150, Technical Physics	3
	<hr/> 12		<hr/> 13

THIRD TERM	Credits	FOURTH TERM	Credits
C.E. 812, Curves and Earthwork	3	C.E. 814, Photogrammetry	3
Cmp.Sc. 1, Basic Computer Programming	1	C.E. 818, Route Surveying	2
E.Mch. 813, Strength and Properties of Materials	3	*Engl. 826, Report Writing	3
Math. 803, Technical Calculus	3	Geosc. 1, Physical Geology	3
Phys. 151, Technical Physics	3		<hr/> 11
	<hr/> 13		

FIFTH TERM	Credits	SIXTH TERM	Credits
C.E. 821, Concrete Technology	3	C.E. 824, Asphalt Technology	3
C.E. 822, Soil Mechanics	3	C.E. 825, Construction Estimating	3
C.E. 823, Highway Organization and Operations	3	Econ. 14, Principles of Economics	3
Human. 1, Values of the Western Cultural Heritage	3	Sp.Com. 200, Effective Speech	3
	<hr/> 12		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

## HOTEL AND FOOD SERVICE

This is an intensive six-term major designed to prepare students for responsible executive positions in the hospitality industry and in health facilities food service administration. The emphasis in Health Facilities Food Service Administration qualifies students as dietetic technicians. The course of study places heavy reliance on experience acquired in an on-the-job setting. To graduate, 68 credits are required.

Students who achieve outstanding records may, upon completing this program, apply for admission to the baccalaureate degree program in Food Service and Housing Administration in the College of Human Development. Nine additional terms of satisfactory work are required to earn the baccalaureate degree.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	
6 credits in English, Sp.Com. 200	9
B. Arts, humanities, social and behavioral sciences	12
At least 3 credits in economics	
C. Physical education	2
II. Requirements for the Major (45 credits)	
A. General	15
F.S.H.A. 50, 225; H.F.S. 850, 860; 3 credits in accounting	
B. Specialization	30
Students may select an emphasis in Hospitality Administration or Health Facilities Food Service Administration.	
Students emphasizing Hospitality Administration will be required to take F.S.H.A. 102, H.F.S. 804 and 870, plus 20 additional credits with the approval of their adviser. Students emphasizing Health Facilities Food Service Administration will be required to take F.S.H.A. 103, H.F.S. 875, Nutr. 351 and 800, plus 16 additional credits with the approval of their adviser.	



LABOR STUDIES

The purpose of this program is to help employees improve their understanding and competence in coping with personal, group, and organizational problems at their worksites, in relationships with employers, and in transactions with the community, the economy, and the polity. The program consists of a core of labor courses supplemented by introductory liberal arts studies which provide (1) basic communication skills, (2) conceptual tools of analysis, and (3) a more general cultural context for the examination of labor problems.

This major leads to the degree of Associate in Labor Studies. To graduate, 60 credits are required.

I. General Education Requirements (21 credits)	Credits
A. Communication skills	
English selection, speech communication selection	6
B. Humanities, natural, and social sciences	15
Biological science, humanities, mathematics, physical science, and social science selections	
II. Requirements for the Major (39 credits)	
A. General	
Econ. 14, Hist. 21, Pl.Sc. 1, Psy. 2, Soc. 1	15
Management selection, speech selection	6
B. Labor Studies	18
L.S. 100*, 102, 103, 104, 156, 296	
	<hr/>
	60

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\*Will be accepted toward the baccalaureate major in Labor Studies.

LETTERS, ARTS, AND SCIENCES\*

The objectives of this program are to broaden the student’s understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student’s interests or career plans. This program is a complete two-year degree program. However, graduates who later seek admission to baccalaureate programs may apply baccalaureate credits toward the new degree. Any 800-level credits taken in the Letters, Arts, and Sciences program are not applicable toward a baccalaureate degree.

This major leads to the degree of Associate in Letters, Arts, and Sciences. To graduate, 60 credits are required.

	<i>Scheduling Recommendation by Term Standing</i>	
	1-3	4-6
I. Required Courses (36 credits)		
Communication skills (9 credits)		
+Engl. 10 (3), Engl. 20 (3)	x	—
Sp.Com. 200 (3)	x	—
Arts (6 credits)		
**Select 6 credits in any courses designated as arts	x	x
Humanities (6 credits)		
**Select 6 credits in any courses designated as humanities	x	x
Social and behavioral sciences (6 credits)		
**Select 6 credits in any courses designated as social and behavioral sciences	x	x
Science (6 credits)		
**Select 6 credits in any courses designated physical, biological, or earth and space sciences	x	x
Mathematics (3 credits)		
**Select 3 credits in mathematics (Math. 4, 6, 10 <i>not</i> acceptable), statistics, computer science, or philosophy (Phil. 12, 212 <i>only</i> )	x	x
II. Related Courses (9 credits)		
**Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, science and mathematics, and foreign language skills	x	x
III. Electives (15 credits)	x	x

\*The 45 required and related credits must be baccalaureate-level courses. For those intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a Bachelor of Arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken.

+Students will be placed in Engl. 4, Engl. 10, or Engl. 30 on the basis of English Placement Test scores. If a student is placed in Engl. 30, successful completion of that course will satisfy the English requirement; in addition, 3 credits will be given for Engl. 10.

\*\*Courses which will satisfy the arts, humanities, social and behavioral sciences, and science and mathematics requirements are defined in the University-wide requirements for a Bachelor of Arts degree described in the *Baccalaureate Degree Programs* catalog. Please note that subject areas which are listed as acceptable under more than one category may be applied to *only one* category.

**MASS COMMUNICATIONS—ADVERTISING**

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to advertising. At the present time this major is not being offered.

FIRST TERM		SECOND TERM	
Engl. 4, Basic Writing Skills	Credits 3	Engl. 10, Composition and Rhetoric I	Credits 3
Journ. 800, History and Survey of Mass Communications	3	Journ. 811, Advertising Copywriting	3
So.St. 800, Human Cultures and the Individual	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	<hr/> 10		<hr/> 12
THIRD TERM		FOURTH TERM	
Human. 800, Sources of Morality	Credits 3	Arts 1, The Arts	Credits 3
Journ. 812, Advertising Layout	3	Journ. 813, Advertising Media and Campaigns	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	<hr/> 10		<hr/> 10
FIFTH TERM		SIXTH TERM	
Human. 1, Values of the Western Cultural Heritage	Credits 3	Music 5, The Fundamentals of Music Appreciation	Credits 3
Journ. 814, Newspaper Advertising	3	Journ. 820, Newspaper Management	3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	<hr/> 10		<hr/> 12

## MASS COMMUNICATIONS—BROADCASTING

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to broadcasting.

To graduate, 61-63 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Journ. 200, Mass Media and Society	3	Math. 800, Business Mathematics	3
Sp.Com. 801, Survey of Broadcasting	3	Sp.Com. 802, Radio and Television Announcing	3
	<hr/> 9		<hr/> 9
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Sp.Com. 803, Basic Writing for Radio and Television	3	Human. 101, Modern Science and Human Values	3
*Humanities selection	3	Sp.Com. 804, Radio Programming, Production, and Performance	3
*Physical or biological science selection	3	Sp.Com. 200, Effective Speech	3
	<hr/> 9	*Arts selection	3
			<hr/> 12
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Sp.Com. 280, Oral Interpretation	3	Music 5, Fundamentals of Music Appreciation	3
Sp.Com. 805, Television Programming, Production, and Performance	3	Sp. Com. 830, Directed Studies	1-3
*Social science selection	3	Thea. 109, The Dramatic Arts in the Mass Media	3
Elective	3	Elective	3
	<hr/> 12		<hr/> 10-12

\*To be selected with the approval of the program coordinator or adviser.



# MASS COMMUNICATIONS—JOURNALISM

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to journalism.

FIRST TERM		SECOND TERM	
Engl. 4, Basic Writing Skills	Credits 3	Engl. 10, Composition and Rhetoric I	Credits 3
Journ. 800, History and Survey of Mass Communications	3	Journ. 801, Beginning News Writing	3
So.St. 800, Human Cultures and the Individual	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	<hr/> 10		<hr/>
THIRD TERM		FOURTH TERM	
Human. 800, Sources of Morality	Credits 3	Arts 1, The Arts	Credits 3
Journ. 802, Beginning Reporting	3	Journ. 803, Fundamentals of Editing	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	<hr/> 10		<hr/> 10
FIFTH TERM		SIXTH TERM	
Human. 1, Values of the Western Cultural Heritage	Credits 3	Music 5, The Fundamentals of Music Appreciation	Credits 3
Journ. 804, Reporting the Community	3	Journ. 820, Newspaper Management	3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	<hr/> 10		<hr/> 12

## MECHANICAL ENGINEERING TECHNOLOGY (Drafting and Design Technology)

This major is intended to prepare detail or layout draftsmen and junior designers for manufacturing industries as well as for the many concerns engaged in installation or erection work. The principal objective is to prepare young men and women for employment in machine design, tool and die design, or structural layout.

To graduate, 73-74 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	E.G. 12, Spatial Analysis	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		
	<hr/> 12		<hr/> 11

THIRD TERM	Credits	+SUMMER TERM	Credits
Cmp.Sc. 101, Introduction to Algorithmic Processes	3	I.E. 812, Manufacturing Processes	3
E.Mch. 811, Elementary Mechanics	3		
I.E. 811, Manufacturing Materials and Processes	3		
Math. 803, Technical Calculus	3		
	<hr/> 12		

FOURTH TERM	Credits	FIFTH TERM	Credits
E.G. 803, Advanced Engineering Drawing	3	I.E. 815, Production Design	3
E.Mch. 813, Strength and Properties of Materials	3	M.E. 805, Kinematics	3
I.E. 315, Industrial Organization and Administration	3	Social science selection	3
Sp.Com. 200, Effective Speech	3	Technical selection	2-3
	<hr/> 12		<hr/> 11-12

SIXTH TERM	Credits
A.E. 809, Structure Design	3
M.E. 810, Product Design	3
Humanities selection	3
Technical selection	3
	<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

+Summer term to be taken at the University Park Campus.

## MEDICAL LABORATORY TECHNOLOGY

This two-year program (eight terms) is designed to provide the necessary general and technical training for hospital personnel between the level of the Certified Laboratory Assistant and the Medical Technologist. The program includes one full year of intensive clinical experience at an affiliated hospital and the theoretical background necessary for the clinical procedures performed by the registered Medical Laboratory Technician.

The program is a two-year program starting in the summer term. To graduate, 71-72 credits are required.

### I. General Education Requirements (39-40 credits)

Communications (6 credits)

Engl. 10 (3)

Sp.Com. 200 (3)

Quantification (4 credits)

Math 4, 5, or 10 (3)

Cmp.Sc. 1 (1)

Natural Science (20-21 credits)

Biòl. 29 (4)

Biol. 41 (3)

Biol. 42 (1)

Chem. 12 (3-4)

Chem. 14 (1)

Chem. 34 (3)

Micrb. 1 (3)

Micrb. 2 (2)

Arts and Humanities (3 credits)

Selection (3)

Social and Behavioral Sciences (6 credits)

Selection (6)

### II. \*Requirements for the Major (32 credits)

Bioch. 100 (8)

Micrb. 101 (8)

Micrb. 102 (8)

Micrb. 801 (8)

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\*Medical Laboratory Technician clinical experience (32 credits). Affiliation now exists with St. Joseph Hospital, Hazleton, Pennsylvania.

**METALLURGICAL ENGINEERING TECHNOLOGY (MET E)**

This program prepares students for positions in the metallurgical and metals-oriented industries as technical personnel in research laboratories and in quality control, and as supervisors of service groups and of production operations.

To graduate, 72 credits are required.

<b>FIRST TERM</b>		<b>SECOND TERM</b>	
Chem. 11, Introductory Chemistry	<i>Credits</i> 3	Chem. 12, Chemical Principles	<i>Credits</i> 3
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Phys. 150, Technical Physics	3
E.G. 1, Engineering Drawing	2	Met.E. 800, Metallurgical Laboratory Practice	4
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	<hr/> 11		<hr/> 13
<b>THIRD TERM</b>		<b>SUMMER TERM</b>	
Chem. 14, Experimental Chemistry	<i>Credits</i> 1	I.E. 812, Manufacturing Processes; or Met.E. 806, Summer Field Practice	<i>Credits</i> 3
Met.E. 801, Principles of Extractive Metallurgy	2		
Phys. 151, Technical Physics	3		
Geosc. 20, Our Earth	3		
Engl. 10, Composition and Rhetoric I; or Engl. 826, Report Writing	3		
	<hr/> 12		
<b>FOURTH TERM</b>		<b>FIFTH TERM</b>	
E.E. 800, Applied Electricity	<i>Credits</i> 2	Econ. 14, Principles of Economics	<i>Credits</i> 3
Met.E. 802, Physical Metallurgy	3	Met.E. 804, Ferrous Metallurgy	3
Met.E. 803, Materials Testing	3	Sp.Com. 200, Effective Speech	3
Cmp.Sc. 101, Introduction to Algorithmic Processes	3	Humanities selection	3
	<hr/> 11		<hr/> 12
<b>SIXTH TERM</b>			
I.E. 809, Inspection and Quality Control	<i>Credits</i> 3		
Met.E. 805, Non-Ferrous Metallurgy	3		
Met.E. 807, Metallurgical Operations	1		
Social science selection	3		
	<hr/> 10		



MINING TECHNOLOGY

A student in mining technology receives a blend of basic sciences, mathematics, communications, humanities and social sciences, and applied courses during the period of study. These courses are sequenced so that basic principles of physical processes are used to understand the specific procedures involved in mining. The curriculum covers a complete spread of material at a level consistent with potential careers of mining technology graduates.

This major prepares students for career positions of a management-oriented or an engineering-oriented nature in the mining industry. Many of the graduates of this program, after serving the necessary apprenticeship, become certified managers in their fields.

The Maintenance Option prepares a student to become a maintenance supervisor. Initially, the graduate would work as an apprentice electrician or mechanic and would gain experience in repairs and in planned maintenance. Once certification is obtained, it is expected that the graduate would become involved with maintenance planning, working as or with the chief mine mechanic or chief mine electrician.

The Production Option prepares a student to become a mine foreman or an engineering aide. Initially, some of the assigned duties are to run transit and act as survey party chief, keep mine maps up-to-date and make projections, take samples and run analyses, make time studies, and assist with materials handling layouts.

The Surface Mining Option prepares a student for work as an engineering aide or as a supervisor in surface mining. Initially, the graduate works as an assistant to engineers or to other supervisors. After a period of training, it is expected that the graduate become involved in such areas of mining as pit design, equipment utilization, environmental control, reclamation, and mine laws and regulations.

To graduate in Mining Technology, 70 credits are required.

Maintenance Option

FIRST TERM		SECOND TERM	
Econ. 14, Principles of Economics	Credits 3	Cmp.Sc. 1, Basic Computer Programming	Credits 1
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
Math. 801, Technical Mathematics	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Mng.T. 800, Mining Technology Orientation	1	Math. 802, Technical Mathematics	3
	10	Phys. 150, Technical Physics	3
			12
THIRD TERM		FOURTH TERM	
Chem. 11, Introductory Chemistry	Credits 3	Mng.T. 807, Electrical Mine Machine Circuits	Credits 3
E.Mch. 811, Elementary Mechanics	3	Mng.T. 810, Mine Machine Dynamics	3
Mng.T. 804, Mine Plant Technology	3	Geosc. 1, Physical Geology; or Geosc. 20, Our Earth	3
Sp.Com. 200, Effective Speech	3	Humanities selection	3
	12		12
FIFTH TERM		SIXTH TERM	
Mng.T. 801, Coal Mining Technology	Credits 3	Engl. 826, Report Writing	Credits 3
Mng.T. 802, Mine Ventilation	3	Mng.T. 809, Mine Machinery Hydraulics	3
Mng.T. 808, Mine Power Distribution	3	Mgmt. 800, Principles of Management	3
Mng.T. 806, Mine Management and Law	3	Mng.T. 811, Practicum in Mine Maintenance	3
	12		12

**Production Option**

<b>FIRST TERM</b>		<b>SECOND TERM</b>	
Econ. 14, Principles of Economics	<i>Credits</i> 3	Cmp.Sc. 1, Basic Computer Programming	<i>Credits</i> 1
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
Math. 801, Technical Mathematics	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Mng.T. 800, Mining Technology Orientation	1	Math. 802, Technical Mathematics	3
	—	Phys. 150, Technical Physics	3
	10		—
			12
<b>THIRD TERM</b>		<b>FOURTH TERM</b>	
Chem. 11, Introductory Chemistry	<i>Credits</i> 3	Geosc. 1, Physical Geology; or Geosc. 20, Our Earth	<i>Credits</i> 3
E.Mch. 811, Elementary Mechanics	3	Mn.Pr. 61, Introduction to Coal Preparation	3
Mng.T. 804, Mine Plant Technology	3	Humanities selection	3
Sp.Com. 200, Effective Speech	3	Mining technology selection	3
	—		—
	12		12
<b>FIFTH TERM</b>		<b>SIXTH TERM</b>	
Mng.T. 801, Coal Mining Technology	<i>Credits</i> 3	Engl. 826, Report Writing	<i>Credits</i> 3
Mng.T. 802, Mine Ventilation	3	Mng.T. 803, Strata Control	3
Mng. 30, Introduction to Mining Engineering	3	Mng.T. 805, Mine Systems Technology	3
Mng. 806, Mine Management and Law	3	Mng. 23, Mineral Land and Mine Surveying	3
	—		—
	12		12

## ASSOCIATE DEGREE MAJORS

### Surface Mining Option

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Cmp.Sc. 1, Basic Computer Programming	1
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
Math. 801, Technical Mathematics	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Mng.T. 800, Mining Technology Orientation	1	Math. 802, Technical Mathematics	3
	<hr/> 10	Phys. 150, Technical Physics	3
			<hr/> 12
 THIRD TERM	 <i>Credits</i>	 FOURTH TERM	 <i>Credits</i>
Econ. 14, Principles of Economics	3	Engl. 826, Report Writing; or Mng. 23, Mineral Land and Mine Surveying	3
E.Mch. 811, Elementary Mechanics	3	Mng.T. 815, Surface Mining Technology	3
Geosc. 20, Our Earth	3	Mn.Pr. 61, Introduction to Coal Preparation	3
Mng.T. 804, Mine Plant Technology	3	Technical selection	3
	<hr/> 12		<hr/> 12
 FIFTH TERM	 <i>Credits</i>	 SIXTH TERM	 <i>Credits</i>
Mng.T. 816, Elements of Surface Mine Design	3	Engl. 826, Report Writing; or Mng. 23, Mineral Land and Mine Surveying	3
Mng.T. 817, Surface Mining Production Technology	3	Mng.T. 806, Mine Management and Law	3
Sp.Com. 200, Effective Speech	3	Mng.T. 818, Surface Mining Hydrology	3
Humanities selection	3	Mng.T. 819, Reclamation Technology	3
	<hr/> 12		<hr/> 12

## NUCLEAR ENGINEERING TECHNOLOGY

This major is designed to provide technically trained personnel to support the rapidly developing nuclear industry between the levels of high school graduate and professional engineer. The wide scope of training prepares the nuclear technologist for careers in radiation safety, reactor operations, radioisotope handling, nuclear and control instrumentation, fuel fabrication, and health physics. A nuclear technologist may work as a radiological safety technician, engineering aide, or as a reactor operator at a nuclear facility.

To graduate, 73 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 801, Fundamentals of D.C. Circuits	3
Engr. 2, Engineering Orientation	1	E.E. 809, D.C. Circuits Laboratory	2
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	<hr/> 12		<hr/> 12
THIRD TERM	Credits	FOURTH TERM	Credits
Chem. 11, Introductory Chemistry	3	Nuc.E. 800, Nuclear and Atomic Science	2
E.E. 814, Electrical Circuits	4	Nuc.E. 805, Principles of Measurement	3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3	Social science selection	3
Math. 803, Technical Calculus	3	Sp.Com. 200, Effective Speech	3
	<hr/> 13		<hr/> 11
FIFTH TERM	Credits	+SIXTH TERM	Credits
*Engl. 826, Report Writing	3	Nuc.E. 803, Elements of Nuclear Power Generation	3
M.E. 807, Heat Transfer	3	Nuc.E. 804, Introduction to Reactor Technology	3
Nuc.E. 801, Radiological Safety	2	Nuc.E. 812, Nuclear Technology Laboratory	3
Nuc.E. 802, Elements of Nuclear Technology	2	Nuc.E. 814, Reactor Technology Laboratory	3
Humanities selection	3		<hr/> 3
	<hr/> 13		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

+Sixth term is to be taken at the University Park Campus.



# RAILWAY ENGINEERING TECHNOLOGY

The objective of this program is to prepare railway technicians for the revitalized railway industry. Such individuals will be able to run surveys, solve right-of-way and drainage problems, deal with track layout and maintenance problems, and work with basic railway structures. Graduates of the Railway Engineering Technology program may find employment as track foremen, track supervisors, track inspectors, and management trainees with the American railroads; as track inspectors with the Federal Railroad Administration; and as designers and estimators with consulting engineers.

To graduate, 72-73 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric	3	E.G. 12, Spatial Analysis	2
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	12		11

THIRD TERM	Credits	SUMMER TERM	Credits
C.E. 812, Curves and Earthwork	3	C.E. 813, Practical Field Problems	4
C.E. 818, Route Surveying	2		
E.Mch. 811, Elementary Mechanics	3		
Math. 803, Technical Calculus	3		
	11		

FOURTH TERM	Credits	FIFTH TERM	Credits
C.E. 840, Hydrology and Drainage	3	C.E. 841, Economic Railway Location and Geometric Design	3
E.Mch. 813, Strength and Properties of Materials	3	E.E. 800, Applied Electricity	2
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
Sp.Com. 200, Effective Speech	3	Social science selection	3
	12		11

SIXTH TERM	Credits
C.E. 842, Railway Track Maintenance and Operation	3
C.E. 843, Railway Track Structure Design and Construction	3
Technical selection	2-3
Humanities selection	3
	11-12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20.

## RECREATION AND PARKS

Graduates of this major, which prepares students to assume leadership roles with recreation program participants, may organize and lead recreation activities in program areas such as sports, performing arts, or nature and camping. The graduate may supervise such facilities as community centers, parks, special sports centers, and nature centers in a variety of settings, e.g., municipal recreation and park departments, youth-serving agencies, hospitals, schools, nursing homes, and private or commercial agencies. To graduate, 66 credits are required for the associate degree.

### RECREATION LEADERSHIP OPTION

I. General Education (38 credits)	<i>Credits</i>
A. Communication skills	9
Engl. 4 or 10 (3)	
Engl. 10 or 20 (3)	
Sp.Com. 200 (3)	
B. Science	6
6 credits selected from: Biol. 11; Bi.Sc. 1, 3, 4; Chem. 11;	
Geosc. 20; Math. 800; Ph.Sc. 7	
C. Arts and humanities	9
A.Ed. 14 (3)	
Thea. 104 (3)	
Thea. 806 (3)	
D. Social and behavioral sciences	6
Psy. 2 or 37 (3)	
Soc. 1 or 5 (3)	
E. Health and physical education	8
Hl.Ed. 303 (2)	
Ph.Ed. 5 (3)	
Team sports	
Lifetime sports	
Swimming	
Ph.Ed. 803, Games for Children (1)	
Ph.Ed. 804, Dance and Gymnastics (1)	
Ph.Ed. 807, Adapted Activities (1)	
II. Requirements for the Major (20-21 credits)	20-21
Rc.Pk. 120, Man and Leisure (3)	
Rc.Pk. 130, Outdoor Living Skills (1)	
Rc.Pk. 150, The Scope of Recreation and Parks Services (1)	
Rc.Pk. 190, Perspectives for the Recreation and Parks Professional (3)	
Rc.Pk. 230, Camp Counseling (2); or Rc.Pk. 877, Therapeutic Recreation Program (3)	
Rc.Pk. 236, Theory and Practice of Recreation Leadership (3)	
Rc.Pk. 850, Field Practicum (3)	
Rc.Pk. 856, Recreation Program Planning (3)	
Rc.Pk. 875, Introduction to Therapeutic Recreation (3)	
III. Electives (5-6 credits)	5-6

RETAILING

This major, which trains for positions in retail stores, provides a minimum foundation of a general education, a basis for understanding customer wants and needs, and a technical knowledge of retail procedures. It includes one term of supervised store experience. The major constitutes a well-balanced program for individual growth and development as well as for specialized employment training. To graduate, 66 credits are required.

	<i>Credits</i>
I. General Education Requirements (21 credits)	
A. Communication skills	
6 credits in English, Sp.Com. 200	9
B. Biological and physical sciences	
A minimum of 3 credits in each area	6
C. Arts and humanities	
3 credits from either area	3
D. Social and behavioral sciences	
Selected with adviser's approval	3
II. Requirements for the Major (45 credits)	
A. Courses in retailing	
Mktg. 804, 805, 806; H.Dev. 321; M.E.R. 213, 214, 301; Rtl. 840, 850	29
B. Courses in individual development	
I.F.S. 16 (1) plus adviser's recommendations for other college courses	7
C. Professional selections	
Selected with adviser's approval	9

SCIENCE

This major is primarily designed to provide for the basic educational needs of students who desire to pursue professional programs as outlined by medical accrediting societies. The program provides a fundamental group of science courses of value to those who seek positions in government or industry where such knowledge is necessary or desirable. To graduate, 64 credits are required.

		<i>Scheduling Recommendation by Term Standing</i>	
		1-3	4-6
I. Required Courses: 52 credits			
A. Communication skills (6 credits)			
Engl. 10 (3)		x	—
Sp.Com. 200 (3)		—	x
B. Social and behavioral sciences (6 credits)		x	x
C. Arts and humanities (6 credits)			
Human. 101 (3)			x
Selection (3)		—	x
D. Quantification (9 credits)			
Math. 10 (3), 20 (3)		x	—
Cmp.Sc. 101 (3)		—	x
E. Natural sciences (25 credits)			
Biol. 11 (3), 29 (4), Chem. 11 (3), Phys. 150 (3)		x	—
Biol. 41 (3), Micrb. 6 (2), Micrb. 7 (1), Phys. 151 (3)		—	x
Chem. 34 (3) or Bioch. 1 (3)		—	x
II. Related Courses: 12 credits			
Select 12 credits from the following biological, mathematical, and physical science courses:		x	x
Biol. 12 (3), 13 (3), 33 (3), 42 (1), Bi.Sc. 3 (3), Chem. 35 (3), 102 (3), Astro 1 (3), Stat. 200 (4), Math. 121 (3), Phil. 212 (3), Phys. 297 (3)			



**SCIENCE**  
**Radiologic Technologist Radiographer Option**

This option is a two-year program and requires eight terms to complete. For graduation, 65 credits are required.

		<i>Scheduling Recommendation by Term Standing</i>		
		1-3	4-6	7-8
I. Required Courses: 52 credits				
A. Communication skills (6 credits)				
Engl. 10 (3)	x	—	—	
Sp.Com. 200 (3)	—	x	—	
B. Social and behavioral sciences (6 credits)	x	x	—	
C. Arts and humanities (6 credits)				
Human. 101 (3)	—	x	—	
Selection (3)	—	x	—	
D. Quantification (9 credits)				
Math. 10 (3), 20 (3)	x	—	—	
Cmp.Sc. 101 (3)	—	x	—	
E. Natural sciences (25 credits)				
Biol. 11 (3), 29 (4), Chem. 11 (3), Phys. 150 (3)	x	—	—	
Biol. 33 (3), 41 (3), Phys. 151 (3), 297 (3)	—	x	—	
II. Related Courses (13 credits)				
R.T.R. 1 (1), 20 (1), 30 (1)	x	—	—	
R.T.R. 40 (5), 50 (1), 60 (1)	—	x	—	
R.T.R. 70 (1), 80 (1), 90 (1)	—	—	x	

## SOCIOLOGY

This major introduces to students the study of human groups and their relationships to each other and to the environment; it enables students to gain some proficiency in the scientific study of group structures and processes. A further objective is to help students become more skillful in working with community institutions, agencies, and organizations either through gainful employment or as a volunteer.

To graduate, 60 credits are required.

I. General Education (33 credits)	<i>Credits</i>
A. Speaking and writing skills	9
Engl. 10 and 20 (6)	
Sp.Com. 200 (3)	
B. Mathematics	3
Math. 4, 6, and 10 are not acceptable	
C. Science	6
Three credits in each of two groups listed below:	
a. Chemistry, physical science, physics	
b. Biological science, biology, biochemistry, microbiology	
c. Astronomy, geological science, meteorology, physical geography	
d. Computer science, statistics, symbolic logic (Phil. 12 or 212 only)	
D. Arts	3
E. Humanities	6
F. Social and behavioral sciences	6
(Not to include sociology)	
II. Requirements for the Major (18 credits)	18
Soc 1 (3)	
Soc. 3 or 5 (3)	
Soc. 7 (3)	
*Additional credits in sociology (9)	
III. +Electives (9 credits)	9

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\*Selected in consultation with the student's adviser to reflect the student's career and/or basic interests.

+For students planning to transfer to the B.A. program in either sociology or social welfare, one college-level course in a foreign language must be passed with at least a grade of C. It is also recommended that University Baccalaureate Degree Requirements be considered in so far as practical.

SOLAR HEATING AND COOLING TECHNOLOGY

This major is designed to prepare solar technicians for the expanding solar and related industries. They will be prepared to help design, specify, test, supervise installation, and make cost estimates for residential and commercial solar energy-assisted heating and cooling systems involving the use of recognized standard components.

To graduate, 72 credits are required.

FIRST TERM		SECOND TERM	
A.E. 801, Building Materials	3	A.E. 802, Methods of Construction	3
E.G. 3, Architectural Graphics	2	E.Mch. 811, Elementary Mechanics	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 150, Technical Physics	3
S.T. 801, Introduction to Solar Technology	2		
	13		12
THIRD TERM		FOURTH TERM	
E.Mch. 813, Strength and Properties of Materials	3	A.E. 803, Plumbing and Fire Protection	3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3	Cmp.Sc. 101, Introduction to Algorithmic Processes	3
Math. 803, Technical Calculus	3	M.E. 881, Elementary Thermo and Fluid Dynamics	2
Phys. 151, Technical Physics	3	Sp.Com. 200, Effective Speech	3
	12		11
FIFTH TERM		SIXTH TERM	
A.E. 809, Structure Design	3	A.E. 804, Heating, Ventilating, and Air Conditioning Layout	3
S.T. 802, Solar Collectors	3	S.T. 804, Analysis of Solar Heating and Cooling Systems	3
S.T. 803, Heat Storage and Distribution Systems	3	S.T. 805, Economics of Solar Technology Systems	3
Social science selection	3	Humanities selection	3
	12		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## SURVEYING TECHNOLOGY

The objectives of the major are to provide a knowledge of the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys, and to develop trained personnel who understand the relation between the precision of measurements and the interpretation of data in addition to having an appreciation of the skills and equipment needed to make precise measurements in the field of surveying.

To graduate, 73-74 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		
	<hr/> 12		<hr/> 11

THIRD TERM	<i>Credits</i>	SUMMER TERM	<i>Credits</i>
C.E. 812, Curves and Earthwork	3	C.E. 813, Practical Field Problems	4
C.E. 818, Route Surveying	2		
Cmp.Sc. 1, Basic Computer Programming	1		
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3		
Math. 803, Technical Calculus	3		
	<hr/> 12		

FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
C.E. 816, Special Surveys	3	C.E. 810, Statistics and Least Squares	3
C.E. 817, Cartographic Techniques	2	C.E. 814, Photogrammetry	3
E.G. 12, Spatial Analysis	2	*Engl. 826, Report Writing	3
E.Mch. 810, Basic Mechanics	2	Pl.Sc. 1, American National Government	3
Sp.Com. 200, Effective Speech	3		
	<hr/> 12		<hr/> 12

SIXTH TERM	<i>Credits</i>
C.E. 815, Geodetic Surveying	3
C.E. 890, Legal Aspects of Surveying	2
Humanities selection	3
Technical selection	2-3
	<hr/> 10-11

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.



## TELECOMMUNICATIONS

### Option of Electrical Engineering Technology

The field of telecommunications includes the transmission of voice and digital signals by telephone, telegraph, radio, television, and satellite. Graduates of this option will be engineering technicians who help select, design, install, operate, maintain, troubleshoot, and repair modern telecommunications systems.

Future uses for telecommunications systems include electronic mail, electronic shopping, home computer terminal tie-ins, remote utility meter reading, and the transmission of biomedical data between hospitals, libraries, and doctors' offices.

To graduate, 75 credits are required.

FIRST TERM		SECOND TERM	
E.G. 1, Engineering Drawing	Credits 2	E.E. 801, Fundamentals of D.C. Circuits	Credits 3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3	I.E. 805, Economics of Industry	2
	<hr/> 12		<hr/> 13
THIRD TERM		FOURTH TERM	
Cmp.Sc. 1, Basic Computer Programming	Credits 1	E.E. 804, A.C. Circuits	Credits 2
E.E. 814, Electrical Circuits	4	E.E. 807, A.C. and Electronics Laboratory	2
E.E. 818, Electrical Circuits Laboratory	1	E.E. 810, Fundamentals of Semiconductors	3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3	Social science selection	3
Math. 803, Technical Calculus	3	TelCm. 840, Introduction to Telecommunications Systems	2
	<hr/> 12		<hr/> 12
FIFTH TERM		SIXTH TERM	
E.E. 816, Linear Electronic Circuits	Credits 3	E.E. 817, Advanced Electronics	Credits 4
E.E. 821, Linear Electronics Laboratory	1	E.E. 820, Advanced Electronics Laboratory	2
E.Mch. 810, Basic Mechanics	2	Sp.Com. 200, Effective Speech	3
Humanities selection	3	TelCm. 843, Transmission	3
TelCm. 841, Switching and Traffic	3	TelCm. 844, Advanced Telecommunications Laboratory	1
TelCm. 842, Elementary Telecommunications Laboratory	1		
	<hr/> 13		<hr/> 13

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 or Engl. 826.

# WILDLIFE TECHNOLOGY

This program will prepare a student in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and care, maintenance, and propagation of animals. They will support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research.

To graduate, 66 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 10, Introductory Engineering Graphics	1	C.E. 809, Topographic Drawing	2
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I; or Engl. 826, Report Writing	3
For. 802, Dendrology	3	Math. 801, Technical Mathematics I	3
Wildl. 801, Introduction to Wildlife Management	3	Wildl. 804, Wildlife Mensuration	3
	<hr/> 10		<hr/> 11

THIRD TERM	<i>Credits</i>	SUMMER TERM	<i>Credits</i>
Wildl. 803, Animal Identification	3	Wildl. 805, Field and Laboratory Techniques	3
Wildl. 812, Wildlife Field Surveys	3	Wildl. 806, Operational Procedures and Equipment	2
Wildl. 814, Habitat Management	3		<hr/> 5
	<hr/> 9		

FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
Sp.Com. 200, Effective Speech	3	For. 812, Elements of Project Supervision in Forestry	3
For. 808, Forest Protection	3	Wildl. 809, Animal Care	3
Wildl. 807, Outdoor Recreation	3	Wildl. 811, Aerial Photo Interpretation	4
Social science selection	3		<hr/> 10
	<hr/> 12		

SIXTH TERM	<i>Credits</i>
Acctg. 816, Introductory Accounting Survey	3
Human. 801, Science, Technology, and Human Values	3
Wildl. 813, Fisheries Management for Technicians	3
	<hr/> 9

## COURSE DESCRIPTIONS

### CREDITS AND HOURS

A credit requires three 75-minute periods per week of an average student's time. The distribution of that time between class activities (such as lecture, recitation, laboratory, field trips, etc.) and outside preparation varies from course to course.

Credits, classroom work, and laboratory work are indicated by three numbers in parentheses immediately following the course title.

1. The first number shows the maximum course credits and therefore the total time required by the course per week. For example, a 2-credit course normally requires 7½ hours per week for class activity and individual preparation.
2. The second number shows the periods of classroom work (a period is 75 minutes), including lecture, recitation, class discussion, demonstration, or various combinations of these.
3. The third number shows the periods of practicum room work (a period is 75 minutes), including laboratory, shop work, studio, drafting room, field trips, etc.

Courses numbered from 800 to 899 are reserved for the associate degree majors. Credit received for 800-series courses is not applicable to any baccalaureate degree program offered by the University with the exception of programs offered by Capitol Campus. Courses numbered from 1 to 399 carry baccalaureate credit and are required in most of the associate degree majors. Elective credit courses vary from campus to campus and term to term, and all of the courses listed below are not offered at each campus. Students may obtain information about the specific course offerings for a given campus from the appropriate *Schedule of Classes*.

### ACCOUNTING (ACCTG)

16. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Accounting for proprietorships, partnerships, and corporations for retailers and manufacturers; financial statement analysis. Students who have passed Acctg. 101 may not schedule this course.

101. INTRODUCTORY FINANCIAL ACCOUNTING (3:2½:1) Fundamentals of the collection, recording, summarization, and interpretation of accounting data.

102. INTRODUCTORY MANAGERIAL ACCOUNTING (3:2½:1) Actual and standard cost systems; managerial uses of cost data. Prerequisite: Acctg. 101.

801. INTRODUCTORY ACCOUNTING (3:2:1)

802. INTRODUCTORY ACCOUNTING (3:2:1) Prerequisite: Acctg. 801.

803. INTERMEDIATE ACCOUNTING (3:3:0) Financial accounting statements, concepts, and procedures; assets, liabilities, owners' equity, statement analysis. Prerequisite: Acctg. 802.

806. FEDERAL TAX ACCOUNTING (3:3:0) Federal tax revenue system as it affects the individual and business; tax planning, research and preparation of returns. Prerequisite: Acctg. 802.

807. MANAGERIAL ACCOUNTING (3:3:0) Cost and budgetary control; preparation of information for decision making. Prerequisite: Acctg. 802.

816. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Fundamentals of accumulation and summarization of accounting data; emphasis on financial statement analysis and the uses of accounting in business.

### ADMINISTRATION OF JUSTICE (ADM J)

7. (Com.D. 7) INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0) An introduction to the study of community, community systems, and impact on the individual.

111. POLICE AND THE COURTS (3:3:0) Examines evolution, organization, operation of law en-

forcement agencies; justice process through conviction, law enforcement interface with other justice system elements.

221. **CORRECTIONAL STRATEGIES (3:3:0)** Examination of the criminal justice system from sentencing through final discharge from correctional supervision, and relationship to preconviction system. Prerequisite: Adm.J. 111.

240. **RESEARCH STRATEGIES IN ADMINISTRATION OF JUSTICE (3:3:0)** A survey of the various research strategies relevant to the investigation of research questions in the administration of justice. Prerequisites: H.Dev. 200; Ed.Psy. 300 or Psy. 15 or Stat. 200.

321. **INITIAL FIELD PROJECT IN ADMINISTRATION OF JUSTICE (8:0:16)** Initial placement to be taken prior to seventh-term standing; may be placed in any type administration of justice agency. Prerequisites: Adm.J. (Com.D.) 7, Adm.J. 111, 221.

## **AEROSPACE ENGINEERING TECHNOLOGY (AERSP)**

800. **APPLIED AERODYNAMICS (3:3:0)** Fluid mechanics; characteristics of wings and airfoils, drag estimation, aircraft performance and static stability. Prerequisite: Phys. 151.

802. **AIRCRAFT STRUCTURAL ANALYSIS (3:3:0)** Truss analysis; shear flow; thin-webbed beams; box beams; semimonocoque structures; joints and fittings; members in tension and compression. Prerequisite: E.Mch. 813.

803. **TECHNICAL AERODYNAMICS (3:3:0)** Potential flow; airfoil theory, vortex systems, wing theory, viscous flow, boundary layers. Prerequisite: Aersp. 800.

804. **AIRCRAFT PROPULSION (3:3:0)** Piston and turbine engines; thermodynamics; propellers; compressor and turbine design; operating characteristics; chemical rockets. Prerequisite: Aersp. 803.

806. **COMPUTER APPLICATIONS TO AEROSPACE ENGINEERING (3:1:5)** Digital and analog computer programming, application to aircraft performance, stability and control, nonlinear and simultaneous differential equations. Prerequisite: Cmp.Sc. 1. Concurrent: Aersp. 800.

807. **AIRCRAFT STRUCTURAL DESIGN (3:1:4)** Aerodynamic and inertia loads; aircraft materials; fasteners; design of components; design layout. Prerequisites: Aersp. 802, 803.

808. **ELECTRONIC INSTRUMENTATION (3:1:5)** Electrical measurements, power supplies, amplifiers, oscillators, servo systems, operational amplifiers, switching and counting systems. Prerequisite: E.E. 800.

809. **AEROSPACE LABORATORY (2:1:3)** Velocity measurements; force measurements; subsonic wind tunnel testing; static and dynamic structural testing; flight testing. Prerequisite: Aersp. 800.

810. **PRINCIPLES OF FLIGHT (3:2:3)** Airplane principles, navigation, meteorology, F.A.A. regulations; airplane performance, flight experiments, flight instruction. Prerequisite: Aersp. 800.

830. **SELECTED TOPICS IN AEROSPACE ENGINEERING TECHNOLOGY (3)** Individual or group work in aerospace engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## **AGRICULTURAL ECONOMICS (AG EC)**

2. **MARKETING (3:3:0)** Development of methods and present status of marketing farm products; emphasis on assembling, grading, and standardization, packing, processing, transporting, storing, financing, and distributing.

6. **FARM MANAGEMENT (3:2:2)** Organizing and operating farm businesses for financial success; measuring profits; improving efficiency of labor, land, and capital; getting started in farming.



## **COURSE DESCRIPTIONS**

800. THE AGRICULTURAL ECONOMY (3:3:0) A survey of the agricultural economy; nature, scope and trends of ag-industry; and agriculture in the national perspective.

801. MANAGEMENT OF COMMERCIAL FARMS (3:2:2) Methods of analysis to determine farm organization, and profitability of alternate enterprises, capital investments, and use of production resources.

802. AGRICULTURAL MARKETING AND SALES (3:3:0) Marketing channels, services, costs, and price relationships involved in distributing farm supplies and agricultural products.

803. INTRODUCTION TO AGRICULTURAL BUSINESS (3:3:0) Economic principles which determine the supply, demand, and price of agricultural products and provide methodology for management decisions.

## **AGRICULTURAL ENGINEERING (AG E)**

800. FARM POWER (2:1:2) Principles and performance characteristics of tractors, electric motors, and other power units; application and maintenance of farm power equipment.

801. FARM STRUCTURES AND UTILITIES (3:2:2) Planning for efficient utilization of buildings, power, and equipment for materials handling and environmental control in agricultural production and processing.

## **AGRONOMY (AGRO)**

800. FIELD AND FORAGE CROP PRODUCTION (3:2:2) Production of field crops and pastures; management practices in relation to crop species; soil adaptation for desired yield and use.

## **AMERICAN STUDIES (AM ST)**

100. INTRODUCTION TO AMERICAN STUDIES (3:3:0) A study of selected attempts to identify and interpret movements and patterns in American culture. Prerequisite: fourth-term standing.

## **ANIMAL INDUSTRY (A I)**

800. LIVESTOCK PRODUCTION (2:1:2) The livestock and meat industry in the United States; management of commercial beef, swine, and sheep enterprises.

## **ANTHROPOLOGY (ANTHY)**

1. INTRODUCTORY ANTHROPOLOGY (3:3:0) Prehistoric and primitive people and cultures; primitive customs and institutions compared with those of modern man.

45. CULTURAL ANTHROPOLOGY (3:3:0) Beginnings of human culture; primitive economic life, society, government, religion, and art; cultural background of personality development.

148. CULTURES OF THE MIDDLE EAST (3:3:0) An introduction to the cultures of the Middle East.

## **ARCHITECTURAL ENGINEERING TECHNOLOGY (A E)**

801. BUILDING MATERIALS (3:3:0) Structural and architectural use of building materials and construction assemblies.

802. METHODS OF CONSTRUCTION (3:1:5) Materials and methods of construction used in buildings, as expressed in drawings. Prerequisites: A.E. 801, E.G. 3.

803. **PLUMBING AND FIRE PROTECTION (3:2:2)** Layout of plumbing and fire protection in buildings to meet code and usage requirements. Prerequisite or concurrent: A.E. 802.
804. **HEATING, VENTILATING AND AIR CONDITIONING LAYOUT (3:2:2)** Fundamental calculations and layout of systems in buildings. Prerequisite: A.E. 803.
805. **ARCHITECTURAL RENDERING (2:0:6)** Architectural rendering techniques, including use of shade and shadow; color. Prerequisite: E.G. 3.
807. **ADVANCED CONSTRUCTION METHODS (3:1:5)** Integration of materials and systems in working drawings. Prerequisite: sixth-term standing.
808. **GRAPHIC ANALYSIS (2:0:6)** Graphical analysis of force systems, centers of gravity, stresses in framed structures, arches, walls, moments and deflections of beams. Prerequisites: E.G. 12, E.Mch. 811.
809. **STRUCTURE DESIGN (3:1:5)** Elementary principles of structural design and detailing in timber, steel, and reinforced concrete; use of handbooks, fundamentals of structural and architectural drafting. Prerequisites: E.Mch. 813; A.E. 802 or E.G. 803.
810. **ARCHITECTURAL ENGINEERING OFFICE PRACTICE (3:3:0)** Procedures involved in production of contract documents, both drawings and specifications. Prerequisite: sixth-term standing.
812. **BUILDING LIGHTING AND ELECTRICAL LAYOUT (3:2:2)** Layout of lighting and electrical distribution in buildings.
814. **STEEL CONSTRUCTION (3:2:2)** Strength of materials as applied to the design of simple steel structures. Prerequisites: A.E. 802, E.Mch. 811.
815. **CONCRETE CONSTRUCTION (3:2:2)** Fundamentals of design and construction of reinforced concrete structures. Prerequisites: A.E. 802, E.Mch. 811.
830. **SELECTED TOPICS IN ARCHITECTURAL ENGINEERING TECHNOLOGY (3)** Individual or group work in architectural engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ART (ART)

110. **DESIGN: COLOR AND LIGHT (2:1:3)** The fundamentals of color. Investigation of color systems, color harmony, and the illusory nature of color on two-dimensional surfaces.
111. **DESIGN: THREE-DIMENSIONAL (2:1:3)** Introduction to design in three dimensions. Principles of visual organization in working with actual space and volume.
120. **INTRODUCTION TO DRAWING (2:1:3)** The study and practice of basic drawing as a way of understanding and communicating.
- 121A. **TECHNIQUES FOR DRAWING (2:1:3)** Drawing with emphasis upon observation, organization, and particular emphasis on the development of skills. Prerequisite: Art 120.
180. **CERAMIC ARTS (2:1:3)** Introduction to potter's wheel techniques; experiments with decorative application; includes the technical concerns for clay, glazes, and kilns. For non-art majors.
280. **INTRODUCTORY CERAMIC ARTS (2:1:3)** The fundamentals of ceramics, throwing, hand-building, and glazing; acquainting the student with ceramic materials, techniques, and philosophy. Prerequisite: 2 credits in studio art.

## ART EDUCATION (A ED)

14. **INTRODUCTORY CRAFTS FOR TEACHERS (3:1:5)** Direct experience with materials such as wood, clay, metal, paper, textiles, and plastics in relationship to the creative needs of children.
806. **ARTS AND CRAFTS (3:1:5)** An introduction to arts and crafts processes, experiences, and materials appropriate for community centers, playgrounds, etc.; designed for recreation leadership.

## **ART HISTORY (ART H)**

100. INTRODUCTION TO ART (3:3:0) An approach to the understanding of art through a critical analysis of selected works of architecture, painting, and sculpture. Students who have passed Art H. 110 may not schedule this course.

110. SURVEY OF WESTERN ART (3:3:0) General survey of major developments in architecture, painting, and sculpture in the Western world. Students who have passed Art H. 100 may not schedule this course.

305. MODERN PAINTING (3:3:0) The development of painting from the French Revolution to the present.

307. AMERICAN ART (3:3:0) History of art in the English colonies and the United States from the seventeenth century to the present.

## **THE ARTS (ARTS)**

1. THE ARTS (3:3:0) Developing perception in the arts through relating the visual, musical, performing and environmental arts.

## **ASTRONOMY (ASTRO)**

1. ASTRONOMICAL UNIVERSE (3:3:0) Nonmathematical description of the astronomical universe and the development of scientific thought. For nonscience majors. Students who have passed Astro. 90 may not schedule this course.

## **BIOCHEMISTRY (BIOCH)**

100. CLINICAL CHEMISTRY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15) Theoretical and practical concepts associated with clinical chemistry testing procedures used in the diagnosis of human diseases. Prerequisite: Chem. 34.

## **BIOLOGICAL SCIENCE (BI SC)**

1. STRUCTURE AND FUNCTION OF ORGANISMS (3:3:0) Origin, development, and cellular basis of life; fundamental principles, processes and structures of organisms. Students who have passed Biol. 11, 12, 13, 27, or 41 may not schedule this course.

2. EVOLUTIONARY RELATIONSHIPS OF ORGANISMS (3:3:0) Examination of the biological world in terms of reproduction, genetics, evolution, development, diversity; interrelationships and interdependence of organisms, populations, communities. Students who have passed Biol. 11, 12, 13, 22, or 33 may not schedule this course.

3. MAN AND HIS ENVIRONMENT (3:3:0) Kinds of environments; past and present uses and abuses of natural resources; disposal of man's wastes; prospects for the future. Students who have passed Biol. 210 or any other upper-level ecology course in biology may not schedule this course.

4. BIOLOGY OF MAN (3:3:0) A general survey of structure and function in man—from conception, through growth and reproduction, to death. Students who have passed Biol. 29 and 41 may not schedule this course.

## **BIOLOGY (BIOL)**

11. LIFE SCIENCE (3:2:2) Structure, metabolism, development, reproduction, and evolution of plants and animals.



## BIOMEDICAL EQUIPMENT TECHNOLOGY

12. **BOTANY (3:2:2)** Structure, metabolism, development, reproduction, and evolution of plants with an introduction to the fields of anatomy, morphology, and physiology. Prerequisite: Biol. 11.
13. **ZOOLOGY (3:2:2)** Morphology, physiology, development, life history, and evolution of animals with a consideration of their importance to human welfare. Prerequisite: Biol. 11.
29. **MAMMALIAN ANATOMY (4:2:4)** Anatomy of a mammal, with special reference to that of man. Students who have passed Biol. 421 may not schedule this course.
33. **HUMAN GENETICS (3:3:0)** Human heredity and its individual and social implications. Students who have passed Biol. 22 may not schedule this course. Prerequisite: 3 credits in biological sciences.
41. **PHYSIOLOGY (3:3:0)** Normal functions of the animal body, with special reference to those of man. Students who have passed Biol. 472 may not schedule this course.
42. **PHYSIOLOGY LABORATORY (1:0:2)** Experiments demonstrating basic physiological principles with special reference to man. Prerequisite or concurrent: Biol. 41.

## BIOMEDICAL EQUIPMENT TECHNOLOGY (B E T)

801. **PHYSIOLOGICAL TRANSDUCERS (3:2:2)** Study of the principles of operation and applications of devices used for the conversion of physiological events to electrical signals. Concurrent: E.E. 816.
802. **BIOMEDICAL INSTRUMENTATION AND SYSTEMS (3:2:2)** Introduction to the operating principles, calibration, and maintenance of biomedical instruments and systems with special emphasis given to patient safety. Prerequisite: B.E.T. 801.
803. **BIOMEDICAL EQUIPMENT LABORATORY (INTERNSHIP) (4:1:6)** Practical experience, within or related to the hospital environment, on a variety of biomedical instruments. Prerequisites: B.E.T. 804 and Biol. 41.
804. **MEDICAL AND CLINICAL EQUIPMENT (3:2:2)** Principles of operation of clinical, medical radiography, intensive care, anesthesia, respiratory, non-invasive imaging, and emergency equipment; hospital electrical safety. Prerequisite: B.E.T. 801.
830. **SELECTED TOPICS IN BIOMEDICAL EQUIPMENT TECHNOLOGY (3)** Individual or group work in biomedical equipment technology for students with specific occupational objectives. Prerequisite: fourth-term standing.

## BUSINESS ADMINISTRATION (B A)

803. **COOPERATIVE PRACTICUM WITH BUSINESS OFFICES (6:0:12)** Cooperative practical work with business offices under the supervision of the instructor.

## BUSINESS LAW (B LAW)

243. **LEGAL ENVIRONMENT OF BUSINESS (3:3:0)** Social control through law: courts, basic policies underlying individual and contractual rights in everyday society. Prerequisite: fourth-term standing.
843. **INTRODUCTION TO BUSINESS LAW (3:3:0)** Legal institutions; basic legal principles pertaining to individual and contractual rights, with special emphasis on business operations and transactions.
850. **REAL ESTATE LAW (3:3:0)** Basic legal principles involved in the negotiation of real estate transactions. Prerequisite: B.Law 843.



## **BUSINESS LOGISTICS (B LOG)**

102. **PHYSICAL DISTRIBUTION (3:3:0)** Physical distribution function in business; role played by transportation, warehousing, location, inventory control; concept of a business logistics system. Prerequisite: fourth-term standing.

104. **TRANSPORT SYSTEMS (3:3:0)** Conceptual model of a transport system; environmental relationships; modal components and internal constraints, with special application to the United States. Prerequisite: fourth-term standing.

206. **TRAFFIC MANAGEMENT (3:3:0)** Analysis of the traffic function in the logistics system. Evaluation of routes, rates, and shipping document procedures. Prerequisite: B.Log. 102 or 104.

## **CHEMICAL ENGINEERING TECHNOLOGY (CH E)**

800. **TECHNICAL CALCULATIONS (3:3:0)** Engineering units and their conversion. Technique of solving elementary problems in industrial stoichiometry, material balances, and heats of reaction. Prerequisite or concurrent: Chem. 13 and 15.

802. **CHEMICAL TECHNOLOGY (3:3:0)** Introductory discussion and problems relating to flow of fluids and transfer of heat. Prerequisite: fourth-term standing.

803. **CHEMICAL TECHNOLOGY (3:3:0)** Elementary discussion and problems involving evaporation, distillation, and air-water interaction. Prerequisite: Ch.E. 800.

820. **CHEMICAL TECHNOLOGY LABORATORY (4:2:6)** Measurements in fluid flow, heat transfer, distillation, mass transfer; chemical analytical techniques; industrial laboratory report writing. Prerequisite or concurrent: Ch.E. 803.

830. **INDUSTRIAL CHEMISTRY (3:3:0)** The commercial preparation of important chemicals and derivatives with emphasis upon the chemistry involved and the flow of material. Prerequisites or concurrent: Chem. 13 and 15.

831. **SELECTED TOPICS IN CHEMICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in chemical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## **CHEMISTRY (CHEM)**

11. **INTRODUCTORY CHEMISTRY (3:2:2)** Selected principles and applications of chemistry. Prior study of chemistry not assumed.

12. **CHEMICAL PRINCIPLES (3-4)** Basic concepts and quantitative relations. Prerequisite: Satisfactory performance on placement examination—students take Chem. 12 for 3 credits. Unsatisfactory performance on placement examination—students take Chem. 12 for 4 credits.

13. **CHEMICAL PRINCIPLES (3:3:0)** Continuation of Chem. 12, including an introduction to the chemistry of the elements. Prerequisite: Chem. 12. Prerequisite or concurrent: Chem. 14.

14. **EXPERIMENTAL CHEMISTRY (1:0:3)** Introduction to quantitative experimentation in chemistry. Prerequisite or concurrent: Chem. 12.

15. **EXPERIMENTAL CHEMISTRY (1:0:3)** Continuation of Chem. 14 with emphasis on analytical procedures. Prerequisite: Chem. 14. Prerequisite or concurrent: Chem. 13.

23. **INTRODUCTION TO MODERN ANALYTICAL CHEMISTRY (4:2:4)** Contemporary methods of chemical and instrumental analysis, including potentiometric titration, specific ion electrodes, spectrophotometry, and chromatography. Prerequisite: Chem. 15.

30. **ORGANIC CHEMISTRY (3:3:0)** Principles and theories; nomenclature; chemistry of the functional groups; applications of spectroscopy. Prerequisite: Chem. 13. Prerequisite or concurrent: Chem. 15.

31. **ORGANIC CHEMISTRY (2:2:0)** Continuation of Chem. 30. Prerequisite: Chem. 30.

33. **ORGANIC CHEMISTRY (2:2:0)** Continuation of Chem. 31, especially the chemistry of polyfunctional organic molecules. Prerequisite: Chem. 31.
34. **ORGANIC CHEMISTRY (3:3:0)** Introduction to organic chemistry with emphasis on the properties of organic compounds of biochemical importance. Prerequisite: Chem. 11 or 12.
35. **ORGANIC CHEMISTRY (3:2:4)** Introduction to organic chemistry with emphasis on the identification of organic compounds by characteristic chemical reactions and by spectroscopy. Prerequisite: Chem. 34.
36. **LABORATORY IN ORGANIC CHEMISTRY (2:0:6)** Basic laboratory operations; applications of theories and principles. Prerequisite or concurrent: Chem. 31.
102. **ENVIRONMENTAL CHEMISTRY (3:3:0)** Applications of chemistry to environmental problems, including air, water, thermal pollution; pesticides; drugs and birth control agents; food additives; etc. For nonchemistry majors; chemistry majors will not receive credit.
800. **GENERAL CHEMISTRY (3:2:3)** Basic principles of chemistry; properties and uses of some industrially important elements and compounds.

## CIVIL ENGINEERING TECHNOLOGY (C E)

809. **TOPOGRAPHIC DRAWING (2:0:4)** Conventional mapping symbols; constructing topographic maps from stadia notes; estimating grading quantities from topographic maps. Prerequisite: E.G. 1 or E.G. 10. Prerequisite or concurrent: C.E. 811 or Wildl. 812.
810. **STATISTICS AND LEAST SQUARES (3:2:2)** Frequency distribution; histograms; frequency polygons; measures of central tendency; dispersion; uses of normal curve; least squares applied to surveying problems. Prerequisite: Math. 803. Prerequisite or concurrent: C.E. 815.
811. **PLANE SURVEYING (3:2:3)** Theory of plane surveying; use, care, and adjustments of surveying equipment; traversing, areas, leveling, stadia, and plane table mapping. Prerequisite or concurrent: Math. 801.
812. **CURVES AND EARTHWORK (3:2:3)** Computation and laying out of horizontal and vertical curves; calculation of cut and fill; setting slope stakes for construction. Prerequisite or concurrent: C.E. 811, Math. 802.
813. **PRACTICAL FIELD PROBLEMS (4:1:9)** Geodetics, topography, field astronomy; route location; hydrographic surveys; land subdivision; use of electronic measuring devices. Prerequisites: C.E. 812, 818.
814. **PHOTOGRAMMETRY (3:2:3)** Interpretation and use of aerial photographs; mapping by photogrammetric methods; application of aerial and terrestrial photographic surveying to specific engineering problems. Prerequisite: C.E. 818.
815. **GEODETIC SURVEYING (3:2:3)** Precision vertical and horizontal control surveys; level nets; reciprocal leveling; triangulation; state plane coordinates; astronomic observations for azimuth and latitude. Prerequisites: C.E. 811, Math. 802.
816. **SPECIAL SURVEYS (3:2:3)** Applications of surveying in hydrography, mining, construction, and subdivision planning; surveying registration law and professional ethics. Prerequisites: C.E. 812, 813.
817. **CARTOGRAPHIC TECHNIQUES (2:0:4)** Use of tools and equipment; projections used in art, advertising, navigation, government maps; relief methods; scribing techniques; map reproduction methods. Prerequisite: C.E. 809.
818. **ROUTE SURVEYING (2:1:3)** Field and office operations connected with highway and railroad location; mass diagram as related to economical distribution of earthwork. Prerequisite: C.E. 811. Concurrent: C.E. 812.
821. **CONCRETE TECHNOLOGY (3:2:3)** Characteristics of Portland cement concrete, physical properties of constituent materials, testing procedures, basics of reinforced concrete. Prerequisite: E.Mch. 813.
822. **SOIL MECHANICS (3:2:3)** Identification, classification, sampling, testing, handling, and consolidation of soils for highway construction. Prerequisites: E.Mch. 810, Phys. 151.

## **COURSE DESCRIPTIONS**

823. **HIGHWAY ORGANIZATION AND OPERATIONS (3:3:0)** Fundamentals of technology; plans and specifications; drainage, cost, traffic studies, and highway safety. Prerequisite: second-year standing in Highway Engineering Technology.
824. **ASPHALT TECHNOLOGY (3:2:3)** The use and testing of asphaltic material as adapted to highways.
825. **CONSTRUCTION ESTIMATING (3:3:0)** Job organization, estimating, cost control, construction methods and equipment for highway construction projects.
830. **SELECTED TOPICS IN CIVIL ENGINEERING TECHNOLOGY (3)** Individual or group work in civil engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.
840. **HYDROLOGY AND DRAINAGE (3:2:2)** Introduction to railway hydrology and drainage, soil studies, erosion control, and hydraulic design of culverts. Prerequisites: C.E. 809, 811.
841. **ECONOMIC RAILWAY LOCATION AND GEOMETRIC DESIGN (3:2:2)** Railway economics, history, design, and maintenance of vertical and horizontal curves; speed and super-elevation. Prerequisites: C.E. 812, 818; C.E. 816 or 840.
842. **RAILWAY TRACK MAINTENANCE AND OPERATION (3:1:5)** Specifications for safety standards for track, programming maintenance operations, track inspection. Prerequisite: C.E. 841. Concurrent: C.E. 843.
843. **RAILWAY TRACK STRUCTURE DESIGN AND CONSTRUCTION (3:1:5)** Design, layout, and construction of yards, turnouts, interlocking plants, and structures. Prerequisites: E.Mch. 813, C.E. 841. Concurrent: C.E. 842.
861. **FLUID FLOW (3:3:0)** Elementary theory of fluid flow: hydrostatics; flow through orifices, Venturi meters, and pipes; flow in open channels; theory of the centrifugal pump. Prerequisites: E.Mch. 810 or 811, Math. 802.
890. **LEGAL ASPECTS OF SURVEYING (2:2:0)** Legal principles affecting the determination of property boundaries; responsibilities of surveyors, attorneys, title companies, and the court. Prerequisite: C.E. 811.

## **CLOTHING AND TEXTILES (CL TX)**

835. **PREPARATION FOR PRACTICUM (1:1:0)** Analysis of employee responsibilities in an operating store situation; preparation for ten weeks of approved store experience. Prerequisite: third-term standing.
836. **PRACTICUM (2)** A minimum of ten weeks of practical store experience approved by the student's major adviser, including an acceptable written report. Prerequisites: Cl.Tx. 835, Mktg. 804, 805.

## **COMMUNITY DEVELOPMENT (COM D)**

7. (Adm.J. 7) **INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0)** An introduction to the study of community, community systems, and impact on the individual.
870. **COMMUNITY LEADERSHIP (2:2:1)** Principles and techniques of participation in voluntary community groups concerned with strengthening family and community life.

## **COMPUTER SCIENCE (CMPSC)**

1. **BASIC COMPUTER PROGRAMMING (1:0:2)** Fundamental characteristics of digital computers; organization and coding of problems for solution on digital computer. Prerequisite: 2 entrance units in mathematics.
44. **TECHNIQUES OF ORGANIZATION (3:3:1)** Programming sequential and random access



devices. Methods of organizing, sorting, merging files on cards, tapes, disks, and drums. Prerequisite: Cmp.Sc. 140.

54. INTRODUCTION TO OPERATING SYSTEMS (3:3:1) Techniques in multiprogramming, queueing, scheduling, handling of interrupts from peripheral devices. Prerequisite: Cmp.Sc. 44.

64. CONTEMPORARY TRENDS IN COMPUTER PROGRAMMING (3:3:0) State of the technology in the design of data-language processors, information processing systems, and large production programs in EDP. Prerequisite: Cmp.Sc. 54.

101. INTRODUCTION TO ALGORITHMIC PROCESSES (3:3:0) Properties of algorithms, languages, and notations for describing algorithms; applications of a procedure-oriented language to problem solving. Students who have passed Cmp.Sc. 201, 203, 401, or 402 may not schedule this course. Prerequisite: 2 entrance units in mathematics.

102. COMPUTER ORGANIZATION AND PROGRAMMING (3:3:0) Computer components and organization, representation of numbers and characters, instruction codes, machine-language programming, assembly systems, input-output, subroutines, and macros. Prerequisite: Cmp.Sc. 101.

110. STRUCTURED PROGRAMMING WITH NUMERICAL METHODS (3:3:0) Introduction to the disciplined construction of algorithms; structured programming; examples from text processing and elementary numerical methods; error analysis; recursion. Prerequisites: Cmp.Sc. 101 or 201; Math. 62.

140. INTRODUCTION TO DATA PROCESSING (3:3:0) Applications of digital computers to problems in data processing with examples from accounting, record updating, inventory control, and report generation. Prerequisite: Cmp.Sc. 101.

803. COMPUTER APPLICATIONS IN BUSINESS (3:3:0) Characteristics of digital computers; the role of data processing in business; programming in a high-level language. Designed for two-year business administration students. Students who have passed Cmp.Sc. 101, 201, or 203 may not schedule this course.

804. UNIT RECORD PROCESSING (1:1:2) Principles and practices of unit record processing.

805. COMPUTER APPLICATION PROBLEM (1-3) The organization, flow charting, programming, debugging, and documentation of a major applied problem in a field of computer application. Prerequisite: fifth-term standing.

890. SPECIAL TOPICS IN COMPUTER PROGRAMMING (1-3) Application of any of several specific computer programming languages to problem solving. Prerequisite: Cmp.Sc. 101.

## CULTURAL FOUNDATIONS OF EDUCATION (CF ED)

115. EDUCATION IN AMERICAN SOCIETY (3:3:0) Introduction to the development of educational institutions, with emphasis on historical, philosophical, and sociological forces.

## DAIRY SCIENCE (D SC)

802. DAIRY PRODUCTION (2:1:2) The feeding, management, breeding, milking, disease control, and housing of dairy cattle; economic factors contributing toward the enterprise.

## ECONOMICS (ECON)

2. INTRODUCTORY MICROECONOMIC ANALYSIS AND POLICY (3:3:0) Methods of economic analysis and their use; economic aggregates; price determination; theory of the firm; distribution.

4. INTRODUCTORY MACROECONOMIC ANALYSIS AND POLICY (3:3:0) National income measurement; aggregate economic models; money and income; policy problems.

14. PRINCIPLES OF ECONOMICS (3:3:0) Analysis of the American economy, emphasizing the



## COURSE DESCRIPTIONS

nature and interrelationships of such groups as consumers, business, governments, labor, and financial institutions. Students who have passed Econ. 2 or are registered in the College of Business Administration may not schedule this course.

315. LABOR ECONOMICS (3:3:0) An economic analysis of the labor market. Prerequisite: Econ. 2.

## EDUCATIONAL PSYCHOLOGY (EDPSY)

14. LEARNING AND INSTRUCTION (3:3:0) Psychology of human learning applied toward the achievement of educational goals; evaluation of learning outcomes.

## ELECTRICAL ENGINEERING TECHNOLOGY (E E)

800. APPLIED ELECTRICITY (2:1:3) Fundamentals of electric circuits; basic principles of electrical machinery and devices; electrical-mechanical analogies; beginning electronics. Prerequisite: Math. 801.

801. FUNDAMENTALS OF D.C. CIRCUITS (3:3:0) Fundamental theory of resistance, current, voltage. Direct-current circuit concepts developed from simplest series circuit through loop analysis; Thevenin's theorem. Prerequisite: Math. 801.

804. A.C. CIRCUITS (2:2:0) Application of network theorems, laws, and methods to alternating-current circuits; balanced and unbalanced polyphase systems. Prerequisite: E.E. 814.

807. A.C. AND ELECTRONICS LABORATORY (2:0:4) Laboratory study of alternating-current circuits and semiconductors; assembly and tracing of electrical and electronic circuits. Must be taken with E.E. 804 and 810. Prerequisite: E.E. 818.

809. D.C. CIRCUITS LABORATORY (2:0:4) Introduction to electrical apparatus, including instruments, their interconnection into basic circuits, observation of circuit behavior, and report writing. Must be taken with E.E. 801.

810. FUNDAMENTALS OF SEMICONDUCTORS (3:3:0) Semiconductor physics and circuit theory including hybrid parameters; equivalent circuits; power amplifiers and frequency response of small signal amplifiers. Prerequisites: E.E. 814, Math. 803.

811. MICROPROCESSORS (3:2:2) Fundamentals of microprocessors, their application, and interfacing for data processing and control. Prerequisite: E.E. 814.

813. FUNDAMENTALS OF ELECTRICAL MACHINES (3:2:2) Direct-current machinery principles and applications; introduction to machines and basic concepts of laboratory methods related to machinery studies. Prerequisites: E.E. 814, 818.

814. ELECTRICAL CIRCUITS (4:4:0) Direct-current circuit analysis; introduction to basic magnetism and magnetic circuits; single-phase circuit fundamentals. Prerequisites: E.E. 801, Math. 802.

815. A.C. MACHINERY AND CONTROL (3:3:0) Alternating-current machinery principles and applications; survey of alternating- and direct-current machinery control methods. Prerequisites: E.E. 804, 813.

816. LINEAR ELECTRONIC CIRCUITS (3:3:0) Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, vacuum tubes and operational amplifiers. Prerequisite: E.E. 817.

817. ADVANCED ELECTRONICS (4:4:0) Fundamentals and application of pulse and digital circuits and electronic devices, such as unijunction transistors, photo devices, and zener diodes. Prerequisite: E.E. 810.

818. ELECTRICAL CIRCUITS LABORATORY (1:0:2) Laboratory study of direct-current networks and alternating-current circuits. Must be taken with E.E. 814. Prerequisite: E.E. 809.

819. A.C. MACHINERY LABORATORY (1:0:2) Alternators, induction generators, single- and polyphase motors, synchro units; transformers, saturable reactors, and protective devices. Must be taken with E.E. 815. Prerequisite: E.E. 807.

820. ADVANCED ELECTRONICS LABORATORY (1:0:2) Laboratory study of solid state pulse, digital, industrial and motor control circuits. Prerequisite: E.E. 807.

821. LINEAR ELECTRONICS LABORATORY (1:0:2) Laboratory study of transistors; study of differential and operational amplifiers. Emphasis is placed on circuit design. Must be taken with E.E. 816. Prerequisite: E.E. 820.

830. SELECTED TOPICS IN ELECTRICAL ENGINEERING TECHNOLOGY (3) Individual or group work in electrical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING (ENGR)

2. ENGINEERING ORIENTATION (1:0:2) Introduction to efficient methods for analyzing and solving engineering problems.

5. EXPERIMENTAL METHODS FOR ENGINEERS (1:0:2) Introduction to experimental methods used in engineering. Applications of basic experimental and computational concepts through student involvement in laboratory experiments.

801. INTRODUCTION TO ENGINEERING (0:1:0) Introduction to all functions and branches of engineering through general lectures.

## ENGINEERING GRAPHICS (E G)

1. ENGINEERING DRAWING (2:0:5) Technical skills and drafting room practices; fundamentals of theoretical graphics; orthogonal, oblique, and perspective projections; working and schematic drawings.

3. ARCHITECTURAL GRAPHICS (2:0:6) Principles of architectural drawing; spatial relationships of points, lines, planes, and solids with architectural applications; shadows, perspective.

10. INTRODUCTORY ENGINEERING GRAPHICS (1:0:3) Multiview projections, pictorial drawings, dimensioning, engineering standards, and working drawings.

11. ENGINEERING DESIGN GRAPHICS (1:0:3) Introduction to creative design, space analysis, graphs, graphical mathematics, vector analysis, and design implementation. Prerequisite: E.G. 10 or 21.

12. SPATIAL ANALYSIS (2:0:5) Spatial relations of points, lines, and solids, with engineering applications. Prerequisite: 1 credit of introductory graphics.

50. ENGINEERING METHODS AND GRAPHICAL COMMUNICATION (3:1:5) Introduction to engineering through experimental methods of measurement and graphical expressions; multi-views, pictorials, dimensioning, space analysis, graphical mathematics, laboratory experience.

800. DRAWING ROOM STANDARDS AND PRACTICES (2:0:6) Interpretation of various types of engineering drawings, including dimensional systems, symbols, and American standard drafting room practices. Prerequisite: E.G. 10.

803. ADVANCED ENGINEERING DRAWING (3:1:5) Application of principles of engineering drawing, including auxiliary views in the layout of detail, assembly, and working drawings. Prerequisite: E.G. 1.

830. SELECTED TOPICS IN ENGINEERING GRAPHICS (1-3) Individual or group work in engineering graphics offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING MECHANICS (E MCH)

11. STATICS (3:3:0) Equilibrium of coplanar force systems; analysis of frames and trusses; noncoplanar force systems; friction; centroids and moments of inertia. Prerequisite or concurrent: Math. 162.

## COURSE DESCRIPTIONS

12. **DYNAMICS (3:3:0)** Motion of a particle; relative motion; kinetics of translation, rotation, and plane motion; work-energy; impulse-momentum. Prerequisites: E.Mch. 11, Math. 250.
13. **STRENGTH OF MATERIALS (3:3:0)** Axial stress and strain; torsion; stresses in beams; elastic curves and deflections of beams; combined stress; columns. Prerequisite: E.Mch. 11.
215. **MECHANICAL RESPONSE OF ENGINEERING MATERIALS (2:2:0)** Mechanical response measures and design theories for engineering materials; elastic and plastic response as affected by stress, strain, time, temperature. Prerequisite: E.Mch. 13.
810. **BASIC MECHANICS (2:2:0)** Forces; moments; resultants; equilibrium of force systems; introduction to dynamics. Prerequisite: Math. 801.
811. **ELEMENTARY MECHANICS (3:3:0)** Forces; moments; resultants; equilibrium of force systems; friction; centroids and moment of inertia of areas; dynamics of particles. Prerequisite: Math. 801.
812. **INTRODUCTION TO DYNAMICS (3:2:2)** Absolute and relative motion related to particles and simple linkages. Force-mass-acceleration, work-energy, and impulse-momentum solution techniques. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Math. 803.
813. **STRENGTH AND PROPERTIES OF MATERIALS (3:3:0)** Axial stress and strain; shear; riveted and welded connections; torsion; beam stresses and deflections; combined axial and bending stresses; columns, ductility, resilience, and toughness. Prerequisite: E.Mch. 811.

## ENGLISH (ENGL)

- \*4. **BASIC WRITING SKILLS (1-3)** Intensive practice in writing sentences and paragraphs and instruction in grammar, usage, and punctuation. Designed for students with deficient preparation. This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.
10. **COMPOSITION AND RHETORIC I (3:3:0)** Organizing and writing clear expository essays. Prerequisite: Engl. 4 or satisfactory performance on English Proficiency Examination.
20. **COMPOSITION AND RHETORIC II (3:3:0)** Building and presenting cogent written arguments, with attention to style. Prerequisite: Engl. 10.
30. **HONORS FRESHMAN COMPOSITION (3:3:0)** Writing practice for specially qualified and screened students. Students who are exempt from Engl. 10 and have passed a special writing test will qualify for this course.
101. **INTRODUCTION TO LITERATURE (3:3:0)** Selected readings in types of literature: short story, novel, essay, poetry, and drama. Not recommended for majors. Prerequisite or concurrent: Engl. 20 or 30.
104. **THE ENGLISH BIBLE (3:3:0)** History of the English Bible and its antecedents; study of the Bible as a cultural and literary document. Prerequisite or concurrent: Engl. 20 or 30.
129. **SHAKESPEARE (3:3:0)** A selection of the major plays studied to determine the sources of their permanent appeal. Not recommended for English majors. Prerequisite or concurrent: Engl. 20 or 30.
132. **AMERICAN LITERATURE FROM THE CIVIL WAR TO WORLD WAR I (3:3:0)** The rise of realism and new voices in poetry. Whitman, Dickinson, Twain, Stephen Crane, Henry Adams, Henry James, and others. Prerequisite or concurrent: Engl. 20 or 30.
133. **MODERN AMERICAN LITERATURE TO WORLD WAR II (3:3:0)** Eliot, Frost, Faulkner, Fitzgerald, Hemingway, O'Neill, and other writers representative of the years between the world wars. Prerequisite or concurrent: Engl. 20 or 30.

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\*Although open to all students, it is especially designed to precede or supplement Engl. 10. Enrollment *either* on the basis of test scores, at the beginning of the term (3 credits), *or* from the first through sixth weeks of the term (1 credit).



140. **CONTEMPORARY LITERATURE (3:3:0)** Representative fiction, essays, poetry, and drama by such writers as Barth, Bellow, Lowell, Mailer, Beckett, Durrell, and Pinter. Prerequisite or concurrent: Engl. 20 or 30.
165. **THE DEVELOPMENT OF THE ENGLISH NOVEL (3:3:0)** Origins and backgrounds of the English novel; selected works from Defoe to the present. Prerequisite or concurrent: Engl. 20 or 30.
196. (Folk. 196) **ESSENTIALS OF ANGLO-AMERICAN FOLKLORE (3:3:0)** A basic introduction to verbal and nonverbal folklore, stressing the basic procedures of collection, classification, and analysis. Prerequisite or concurrent: Engl. 20 or 30.
200. **INTRODUCTION TO LITERARY ANALYSIS (3:3:0)** Student writing in response to the criticism of values embodied in masterpieces of literature. Prerequisite: Engl. 20 or 30.
212. **TECHNIQUES OF FICTION (3-6)** Frequent written assignments in the short story; open to students who have shown proficiency in writing. Prerequisite: Engl. 20 or 30.
213. **INTRODUCTION TO VERSE WRITING (3-6)** Practice in the techniques of verse writing and study of poetic form. Selected readings. Prerequisite: Engl. 20 or 30.
826. **REPORT WRITING (3:3:0)** Interpretation of statistical data and writing of technical reports. Prerequisite: Engl. 4 or 10.

## **FINANCE (FIN)**

108. **PERSONAL FINANCE (3:3:0)** Personal management of budgets, bank accounts, loans, credit buying, insurance, real estate and security buying. May not be scheduled by College of Business Administration students. Prerequisite: fourth-term standing.
210. **COMMERCIAL BANK MANAGEMENT (3:3:0)** Fundamental principles underlying management of a commercial bank; capital funds; asset and liability management; value maximization; legal and operational constraints. Prerequisite: Fin. 105.
807. **BANKING AND CORPORATE FINANCE (3:3:0)**

## **FOOD SERVICE AND HOUSING ADMINISTRATION (FS HA)**

50. **IN-SERVICE TRAINING (0-1)** Eight weeks or 300 hours of practical experience in operations of the type in which the student is majoring.
102. **INTRODUCTION TO FOOD SERVICE AND HOUSING ADMINISTRATION (3:3:0)** Professional duties of management personnel in large food and housing operations, their working conditions, and organizations which they serve.
103. **INTRODUCTION TO HEALTH FACILITIES FOOD SERVICE ADMINISTRATION (3:3:0)** Professional functions of the hospital food service system, relationships with the nutrition component of food service system, and organization served.
225. **FOOD AND LABOR MANAGEMENT AND CONTROL (3:3:0)** Techniques for analyzing and controlling costs in hospitality organizations. Prerequisite: 3 credits in accounting.
320. **HOSPITALITY INDUSTRY EQUIPMENT AND UTILITIES (3:3:0)** Principles governing the purchase, use, and operation of heating, plumbing, refrigeration, air conditioning and other equipment and utilities.
321. **HOSPITALITY INDUSTRY MAINTENANCE (2:2:0)** Maintenance management in hospitality operations.



## FORESTRY (FOR)

203. FIELD DENDROLOGY (2:0:6) Identification of trees and shrubs by leaf, fruit, bud, twig, and bark.
220. FOREST ECOSYSTEM PROTECTION (3:3:0) Basic biological, physical, sociological, and management concepts involved in protecting the forest ecosystem from wild fire, insects, and disease.
221. FOREST FIRE TECHNOLOGY (1:0:3) Technological aspects of controlling and using fire in the forest environment. Prerequisite: For. 220.
240. SILVICULTURAL PRACTICES (3:2:3) Principles and techniques of forest establishment, culture, regeneration, and harvesting. Prerequisite: For. 203.
241. AERIAL PHOTO INTERPRETATION (4:2:6) Aerial photo interpretation techniques applied to land management inventories, mapping, road location, and procurement. Prerequisites: For. 203; 804 and 806, or 366.
242. ELEMENTS OF PROJECT SUPERVISION IN FORESTRY (3:3:0) Supervisory techniques developed through an understanding of the behavioral sciences applied to field forestry personnel management.
802. DENDROLOGY (2:0:6) Taxonomy of woody plants; their field identification; the geographic distribution of the important forest trees of the United States.
803. DENDROLOGY (2:0:6) Continuation of For. 802 with emphasis on the taxonomy of the angiosperms. Prerequisite: For. 802.
804. FOREST MENSURATION (3:2:3) Measurement of forests and forest products.
806. FOREST INVENTORIES (3:2:3) Application of land surveying and sampling techniques, including statistical analysis, for the determination of timber volume and growth.
807. FOREST RECREATION (3:2:3) Development, construction, and management of forest recreation areas and facilities. Prerequisite: For. 815.
808. FOREST PROTECTION (3:2:3) Forest fire prevention, detection, behavior, and suppression; fire plans and statistics; insect and disease control.
809. FOREST VALUATION (3:2:3) Determination of forest values through a consideration of markets, logging and milling costs, stumpage appraisals, and other forest values. Prerequisite: For. 806.
810. FOREST IMPROVEMENTS (3:2:3) Use of materials and equipment in developing, operating, and maintaining the forest property.
811. FOREST PHOTO INTERPRETATION (4:2:6) Application of aerial photo interpretation techniques by forest technicians in land management. Prerequisite: For. 816.
812. ELEMENTS OF PROJECT SUPERVISION IN FORESTRY (3:3:0) Supervisory techniques and elements of project layout.
814. FORESTRY LEADERSHIP PRACTICUM (1:0:3) Leadership techniques applied to standard forestry field operations. Prerequisite or concurrent: For. 812.
815. FOREST SURVEYING I (3:2:3) Basic plane surveying techniques as applied to forestry practices. Prerequisite or concurrent: Math. 801.
816. FOREST SURVEYING II (3:2:3) Standard mapping techniques as applied to field forestry situations. Prerequisite: For. 815.
817. URBAN FORESTRY (3:2:3) The application of land treatment techniques and forestry practices to urban environments. Prerequisites: For. 802, 807.
818. INDIVIDUAL STUDIES (1-3 per term) Individual study of forest technology.
819. SOUTHERN FOREST STUDY TOUR (1) A work-study tour of public and private forestry enterprises in selected areas of the southern United States. Prerequisite: fourth-term standing.
820. ADVANCED FOREST MEASUREMENTS (1) Application of point and 3P sampling methods as a means of developing the data base for integrated forest management planning. Prerequisites: For. 809, 816, 826.

821. **FIELD STUDIES IN ECOLOGY (1)** Field studies in ecological problems, challenges, and impacts related to normal forest practices in general resource management. Prerequisites: For. 809, 816, 826.
822. **FOREST MANAGEMENT SYSTEMS (1)** Field projects in the integrated application of silvicultural, mensurational, and financial principles in forest management planning. Prerequisites: For. 809, 816, 826.
824. **INTRODUCTION TO HARVESTING (1:0:3)** Practical instruction in the use and maintenance of hand tools and small power tools used in logging operations.
825. **HARVESTING TECHNIQUES (1:0:3)** Practical instruction in the operation of heavy equipment used in timber harvesting. Prerequisite: For. 824.
826. **REFORESTATION AND INTERMEDIATE OPERATIONS (1:0:3)** Field practicum in planting, pruning, thinning forest stands. Prerequisite: For. 825.

## FRENCH (FR)

1. **ELEMENTARY FRENCH (4:3:2)** Grammar, with reading and writing of simple French; oral and aural work stressed.
2. **ELEMENTARY FRENCH (4:3:2)** Grammar and reading continued; oral and aural phases progressively increased. Prerequisite: Fr. 1.
3. **INTERMEDIATE FRENCH (4:3:2)** Grammar, reading, composition, oral and aural exercises. Prerequisite: Fr. 2.
140. **FRENCH NOVEL IN ENGLISH TRANSLATION (1-6)** Readings of selected French masterpieces in translation; discussion of recurring themes in several literary periods.

## GEOGRAPHY (GEOG)

20. **MAN'S WORLD: AN INTRODUCTION TO MODERN HUMAN GEOGRAPHY (3:3:0)** Spatial perspective on human societies in a modernizing world; regional examples; use of space and environmental resources; elements of geographic planning.
26. **HUMAN GEOGRAPHY (3:3:0)** Introduction to concepts, principles, and theories of spatial organization.

## GEOSCIENCES (GEOSC)

- \*1. **PHYSICAL GEOLOGY (3:2:3)** Earth processes and their effects on the materials, structure, and morphology of the earth's crust. Practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps.
- \*20. **OUR EARTH (3:2:2)** Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation.
- \*21. **EARTH HISTORY (3:2:2)** Evolution of the earth; changing patterns of mountains, lowlands, and seas; development of living organisms. Practicum includes field trips, studies of geologic maps, geologic problems, fossils.

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\*This course includes from one to several field trips for which an additional charge will be made to cover transportation.

## GERMAN (GER)

1. BASIC GERMAN (3:3:0) Listening, speaking, reading, writing; introduction to basic structures and vocabulary through dialogs and literary-cultural readings.
2. BASIC GERMAN (3:3:0) Listening, speaking, reading, writing; further study of basic structures and vocabulary through dialogs and literary-cultural readings. Prerequisite: Ger. 1.
3. INTERMEDIATE GERMAN (3:3:0) Continued skill development; readings consisting of short literary and journalistic writings; increased attention to German cultural context. Prerequisite: Ger. 2 or 12.
4. INTERMEDIATE GERMAN (3:3:0) Continued skill development; readings consisting of short stories, short plays, poems, articles; German in its cultural context. Prerequisite: Ger. 3.
100. GERMAN CULTURE AND CIVILIZATION (3:3:0) Life of the German people from the early Middle Ages to modern times; their literature and arts, music, science, and philosophy.

## HEALTH EDUCATION (HL ED)

303. EMERGENCY CARE (2:1:2) Competencies leading to American Red Cross Advanced First Aid and Emergency Care and American Heart Association Cardiopulmonary Resuscitation certification.

## HISTORY (HIST)

16. INTRODUCTION TO THE HISTORY OF THE ANCIENT WORLD (3:3:0) Civilization of the ancient Mediterranean world from primitive man to the decline of the Roman Empire.
17. INTRODUCTION TO THE HISTORY OF THE MIDDLE AGES (3:3:0) Rise and development of the civilization of medieval Europe from the decline of Rome to 1500.
18. MODERN EUROPE 1500-1815 (3:3:0) Renaissance and Reformation; rise of national states; overseas expansion; development of science; decline of feudalism; French Revolution and Napoleonic era.
19. MODERN EUROPE, 1815 TO THE PRESENT (3:3:0) Growth of European democracy; scientific progress; Italian and German unification; Industrial Revolution; imperialism; the world wars; search for security and stability; Fascism and Communism.
20. HISTORY OF THE UNITED STATES TO 1865 (3:3:0) Introductory survey including the colonial background and emphasizing the impact of nationalism and sectionalism on American political, economic, social, and cultural development.
21. HISTORY OF THE UNITED STATES SINCE 1865 (3:3:0) Integrated survey emphasizing the emergence of a dominantly urban-industrial society; expanded role of government; America's increasing involvement in world affairs.
141. MEDIEVAL AND MODERN RUSSIA (3:3:0) Introductory survey including political, social, economic, and cultural development of Kievan, Muscovite, and Imperial Russia.
142. HISTORY OF COMMUNISM (3:3:0) Marxism; Leninism and evolution of the Soviet Union; formation and development of the communist bloc; impact of Chinese Communism.
151. TECHNOLOGY AND SOCIETY IN AMERICAN HISTORY (3:3:0) Development of technology in America from colonial times; its reception and its influence on social, economic, and political life.
156. (L.S. 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.
171. HISTORY OF MODERN SOUTHEAST ASIA (3:3:0) Sociopolitical survey of Southeast Asian history emphasizing the modern period. Origins of traditional civilization, colonialism and nationalism, problems of independence.
174. THE HISTORY OF TRADITIONAL EAST ASIA (3:3:0) Comparative cultural, institutional, and social history of traditional China and Japan to their contact with the industrialized West.



175. **THE HISTORY OF MODERN EAST ASIA (3:3:0)** Comparative survey of the internal developments and external relations of China and Japan since their contact with the industrialized West.

191. **EMERGING AFRICA (3:3:0)** Indigenous African societies; impact of Rome, Islam, and Europe; slave trade; colonialism; nationalism; problems since independence.

195. **HISTORY OF CANADA (3:3:0)** An integrated survey from French colonial beginnings to modern Dominion status, with special emphasis on relations with the United States.

## **HOTEL AND FOOD SERVICE (H F S)**

802. **SANITATION AND HOUSEKEEPING (3:3:0)** Practical applications of sanitation principles to food service and housing delivery systems; organization and work methods in the housekeeping function.

804. **HOTEL AND FOOD SERVICE MERCHANDISING (3:3:0)** Merchandising as a system distributing benefits, collecting costs, concerned with motivating consumers. Topics include: promotion, menu planning, and research methods.

805. **TRAINING AND SUPERVISION (3:3:0)** Methods and techniques of training and supervising food service and housing employees for overall efficiency of operation.

810. **FOODS EXPERIENCE (4:3:2)** Theory, observation, and practice in food services; emphasis on planning, preparation, and service in commercial food operations.

850. **FOOD SERVICE DELIVERY SYSTEMS (4)** Physical characteristics of principal food product groups considered. Topics include: purchasing problems, preparation techniques, quality and cost control. Prerequisites: Acctg. 101, F.S.H.A. 225.

860. **FOOD SERVICE SUPERVISION (4)** The principal food service administrative routines are considered from the point of view of the supervisor and middle manager. Prerequisite: H.F.S. 850.

870. **FOOD AND BEVERAGE ADMINISTRATION (4)** Components of food service systems are identified and studied as separate problems and as a total system. Prerequisite: H.F.S. 860.

875. **HOSPITAL FOOD OPERATING SYSTEMS (4)** Consideration of hospital food service system as determined by patient needs, physical plant, operating policies, cost constraints and quality standards. Prerequisite: H.F.S. 860.

## **HUMAN DEVELOPMENT (H DEV)**

100. **INTRODUCTION TO HUMAN DEVELOPMENT (1:1:0)** Human development as a process of man-environment transactions, and the relationships of various fields to the study of that process.

200. **EMPIRICAL INQUIRY IN HUMAN DEVELOPMENT (3:3:0)** Introduction to methods and philosophy of empirical inquiry applied to problems of human development.

321. **FIELD PROJECTS (1-12)** Independent study and research in a human service program; written and oral summary of rationale, procedures, findings.

## **HUMANITIES (HUMAN)**

1. **VALUES OF THE WESTERN CULTURAL HERITAGE (3:3:0)** Fundamental values of human experience as expressed in outstanding philosophical and literary works.

2. **SHAPING OF THE MODERN MIND (3:3:0)** Relevance to the present age of influential literary and philosophical texts illustrative of the principal epochs of Western civilization.

21. **IDEAS AND ARTS (3:3:0)** Interaction of intellectual and aesthetic values from the Renaissance to the present.

50. **THE LITERATURE AND LORE OF MINING (3:3:0)** Experience and values of mining tradition: survey of the literature and lore, including fields.



## COURSE DESCRIPTIONS

101. MODERN SCIENCE AND HUMAN VALUES (3:3:0) Relationships of science to the aspirations, values, and arts of man.
800. SOURCES OF MORALITY (3:3:0) The uses of law and love in man's endeavor to perfect himself.
801. SCIENCE, TECHNOLOGY, AND HUMAN VALUES (3:3:0) The effect of science and technology upon man's being, thought, and action.

## INDIVIDUAL AND FAMILY STUDIES (I F S)

16. EFFECTIVE INTERPERSONAL SKILLS (1:1:0) Training in interaction skills required for the development and maintenance of satisfying interpersonal relationships.
129. INTRODUCTION TO INDIVIDUAL AND FAMILY DEVELOPMENT (3:3:0) Introduction to psychosocial and family development at all stages of the individual and family life cycle.
319. FAMILY FINANCIAL MANAGEMENT (3:3:0) How families plan their finances and factors that determine their decisions.
329. INFANCY AND EARLY CHILDHOOD (3:3:0) Theories, research findings, and methods in social/behavioral/biological sciences related to developmental processes and intervention during infancy/early childhood. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.

## INDUSTRIAL ENGINEERING (I E)

315. INDUSTRIAL ORGANIZATION AND ADMINISTRATION (3:3:0) Fundamental principles of organization leading to intelligent appreciation of the simpler problems of factory organization and operation. Students registered in industrial engineering may not schedule this course.

## INDUSTRIAL ENGINEERING TECHNOLOGY (I E)

804. NOMOGRAPHY (1:0:2) The preparation of charts and monograms used in the analysis and presentation of engineering and production problems. Prerequisite: Math. 802.
805. ECONOMICS OF INDUSTRY (2:2:0) Internal economics of industrial enterprise, cost factors, and methods of comparing alternate proposals.
807. STATISTICAL QUALITY CONTROL (3:3:0) The application of this technique to the control of the manufacturing processes and to inspection. Prerequisite: Math. 802.
808. PLANT LAYOUT (2:0:6) Arrangement and layout of equipment and processes in an industrial plant for the most economical production. Prerequisites: E.G. 10, I.E. 816.
809. INSPECTION AND QUALITY CONTROL (3:2:2) Inspection methods and procedures and their application to control and acceptance sampling based on statistical methods. Prerequisite: E.G. 31.
810. PRODUCTION LAYOUT AND CONTROL (3:1:6) Arrangement of equipment and processes in industry and subsequent control of production through stores, routing, scheduling, dispatching, and follow-up techniques. Prerequisite: I.E. 816.
811. MANUFACTURING MATERIALS AND PROCESSES (3:2:3) Mechanical properties of materials; primary processing methods used in manufacturing, emphasizing ferrous metals, their relationship to other metals and nonmetals.
812. MANUFACTURING PROCESSES (3:1:6) Technology related to metal removal, dimensional inspection, metal joining, hot and cold forming heat treating, metal casting, properties of materials. Prerequisite: I.E. 811.
815. PRODUCTION DESIGN (3:1:6) The planning, designing, and specifying of both standard and special tools required for the production of manufactured goods. Prerequisites: E.G. 803, I.E. 812.

816. **METHODS ANALYSIS AND MOTION STUDY (3:1:6)** Construction and use of process charts, primary approach to operation analysis, and principles of motion economy. Prerequisite: I.E. 812.

817. **TIME STUDY AND WAGE PAYMENT (3:1:6)** Fundamentals of time study with instruction in time study practices; application of time studies to incentive wage payment systems. Prerequisite: I.E. 816.

## **INSURANCE (INS)**

800. **INSURANCE PRINCIPLES (3:3:0)** Introductory survey of all lines of insurance for handling business and personal risks.

810. **LIFE INSURANCE (3:3:0)** The life insurance contracts as methods of treating the problems of premature death and superannuation. Prerequisite: Ins. 800.

820. **PROPERTY AND CASUALTY INSURANCE (3:3:0)** Fundamental principles of property and casualty insurance. Prerequisite: Ins. 800.

830. **INSURANCE PRACTICUM (3:3:0)** Practical introduction to insurer operations in company and agency offices. Prerequisite: Ins. 820.

## **INTERNATIONAL BUSINESS (I B)**

862. **INTERNATIONAL BUSINESS (3:3:0)**

## **INTERNATIONAL UNDERSTANDING (INT U)**

200. **INTERNATIONAL UNDERSTANDING AND WORLD AFFAIRS (3:3:0)** Interdisciplinary consideration of international problems, conflict and accommodation; impact of various cultures and ideologies on world affairs and foreign policy. Credit will not be given for both this course and Pl.Sc. 14. Prerequisite: fourth-term standing.

## **JOURNALISM (JOURN)**

200. **THE MASS MEDIA AND SOCIETY (3:3:0)** Mass communications in the United States; organization, role, content, and effects of newspapers, magazines, television, radio, books, and films. Students who are planning to enroll in, or who are currently enrolled in, the School of Journalism may not take this course.

800. **HISTORY AND SURVEY OF MASS COMMUNICATIONS (3:3:0)** History and role of mass media and advertising in society; nature of newspaper, magazine, broadcasting, book, and motion picture industries.

801. **BEGINNING NEWS WRITING (3:1:4)** Techniques of news writing with emphasis on organizing the story. Detailed critiques and class discussion of student writing. Prerequisites: Engl. 4, Journ. 800, ability to type.

802. **BEGINNING REPORTING (3:1:4)** The techniques of gathering news; problems of taste, ethics, and legality in reporting the news; community reporting assignments. Prerequisite: Journ. 801.

803. **FUNDAMENTALS OF EDITING (3:1:4)** Techniques of editing material for publication; printing processes; copyreading; headline writing; typography; picture editing; layout; legal and ethical considerations. Prerequisite: Journ. 802.

804. **REPORTING THE COMMUNITY (3:0:9)** Practicum in newspaper reporting, editing, and production. Prerequisite: Journ. 803.

811. **ADVERTISING COPYWRITING (3:1:4)** Techniques of writing advertising headlines and

## **COURSE DESCRIPTIONS**

copy, with emphasis on spelling, grammar, and word choice. Detailed critiques of student writing. Prerequisite: Journ. 800.

812. **ADVERTISING LAYOUT (3:1:4)** Print advertisement design and production, including typography, plate making, mat services, shop procedures, etc.; detailed critiques of layouts; field trips. Prerequisite: Journ. 800.

813. **ADVERTISING MEDIA AND CAMPAIGNS (3:1:4)** Media selection and coordination, creative strategy, and campaign execution. Each student plans and produces a complete advertising campaign. Prerequisites: Journ. 811, 812.

814. **NEWSPAPER ADVERTISING (3:0:9)** Management of the newspaper advertising department, advertising sales promotion, preparing the sales presentation, dealing with the advertiser, advertising page make-up. Prerequisite: Journ. 813.

820. **NEWSPAPER MANAGEMENT (3:3:0)** Managing and publishing newspapers in the United States; problems of law, finance, personnel, promotion, technological change, and community service. Prerequisite: Journ. 803 or 813.

## **LABOR STUDIES (L S)**

100. **INDUSTRIAL RELATIONS (3:3:0)** Introductory analysis of the employment relationship and of the interrelated interests of managements, workers, unions, and the public.

102. **STRUCTURE AND FUNCTION OF UNIONS (3:3:0)** A study of the internal structure, goals, and impact on society of unions.

103. **LABOR LEGISLATION (3:3:0)** A study of legislation regulating the functioning of trade unions.

104. **THE PRACTICE OF COLLECTIVE BARGAINING (3:3:0)** A study of the process of collective bargaining, the issues in collective bargaining, and bargaining relationships.

156. (Hist. 156) **HISTORY OF THE AMERICAN WORKER (3:3:0)** A study of the American worker from the preindustrial era to the present.

296. **INDEPENDENT STUDIES (1-12)**

## **LIBRARY STUDIES (L ST)**

1. **INTRODUCTION TO THE USE OF THE LIBRARY (3:2:2)** Use of the card catalog, periodical indexes, and reference books; test problems and bibliographies.

## **MANAGEMENT (MGMT)**

800. **PRINCIPLES OF MANAGEMENT (3:3:0)**

801. **PRINCIPLES OF MANAGEMENT (3:3:0)** Prerequisite: Mgmt. 800.

802. **SUPERVISORY MANAGEMENT (3:3:0)** Preparation for supervisory positions in formal organizations. Emphasis placed on the motivational aspects of the supervisor's job. Prerequisite: Mgmt. 800.

## **MAN-ENVIRONMENT RELATIONS (M E R)**

213. **PRINCIPLES OF CLOTHING I (2:2:0)** Analysis of aesthetic, functional, and socio-psychological factors related to clothing needs and usage.

214. **PRINCIPLES OF CLOTHING II (2:2:0)** Current cultural influences on the designer, design media, and construction processes in the mass production technology of clothing. Prerequisite: M.E.R. 213.



215. CLOTHING CONSTRUCTION (1-4) Experimentation with construction techniques for selected fabrics and design requirements. Prerequisite or concurrent: M.E.R. 213, or consent of instructor.

301. ELEMENTARY TEXTILES (3:2:2) Recognition, use, and care of textiles related to characteristics of fibers, yarns, fabric construction, and finishes. Prerequisite: Chem. 11 or Ph.Sc. 8.

## MARKETING (MKTG)

800. PRINCIPLES OF MARKETING (3:3:0)

801. PRINCIPLES OF MARKETING (3:3:0) Prerequisite: Mktg. 800.

802. PROMOTION MANAGEMENT (3:3:0) The application and management of various forms of persuasive communication with potential customers; personal selling, sales management, advertising, sales promotion. Prerequisite: Mktg. 801.

803. PRINCIPLES OF RETAILING (3:3:0) Introduction to the management of retailing organizations, with emphasis on decision making. Not open to retailing majors.

804. PRINCIPLES OF RETAILING SALESMANSHIP (3:3:0) Principles of selling applied to the retail level of trade; practical application of these principles in various sales situations.

805. RETAILING I (3:3:0) An analysis of the management and merchandising policies of various types of retailing institutions.

806. RETAILING II (3:3:0) Merchandising, promotion, and control policies of retail store management. Prerequisite: Mktg. 805.

807. INTRODUCTION TO MARKETING RESEARCH (3:3:0) Managerial aspects of marketing research, with emphasis on practical details of operating a small-scale project. Prerequisites: Mktg. 800, Q.B.A. 801.

## MATHEMATICS (MATH)

4. INTERMEDIATE ALGEBRA (3:3:0) Polynomials, fractions, exponents, radicals, first and second degree equations and inequalities, relations and functions, systems of equations. Limited to students whose scores on the algebra proficiency examination indicate a need for this course.

5. COLLEGE ALGEBRA (3:3:0) Relations and functions; roots of polynomials and complex numbers; sequences, mathematical induction; binomial theorem; matrices, determinants; analytic geometry. Prerequisite: 1 unit of algebra or Math. 4.

6. PLANE TRIGONOMETRY (3:3:0) Functions; use of logarithms; solution of triangles; trigonometric equations; identities. Prerequisites: 1½ units of algebra or Math. 5; 1 unit of geometry.

10. PRECALCULUS MATHEMATICS (3:3:0) Polynomial expressions; simultaneous equations; exponents, logarithms, binomial theorem; polynomial roots; trigonometric functions; right triangles; identities, lines and conic sections. Limited to students whose scores on the algebra and trigonometry proficiency examination indicate a need for this course.

17. FINITE MATHEMATICS (3:3:0) Introduction to logic, sets, probability. Prerequisite: 3 units of high school mathematics.

18. ELEMENTARY LINEAR ALGEBRA (3:3:0) Matrices and vectors; transformations; systems of linear equations; convex sets and linear programming. Prerequisite: 3 units of high school mathematics.

35. GENERAL VIEW OF MATHEMATICS (3:3:0) Survey of mathematical thought in logic, geometry, combinatorics, and chance.

36. INSIGHTS INTO MATHEMATICS (3:3:0) Examples of mathematical thought in number theory, topology, theory of symmetry, and chance. Prerequisite: one unit of algebra or Math. 4.



## COURSE DESCRIPTIONS

120. **TECHNIQUES OF CALCULUS I (3:3:0)** Functions and graphs, derivatives, applications. Students may take only one course for credit from Math. 65, 120, 161, 161A. Prerequisite: a satisfactory score on the algebra proficiency examination or, in the case of an unsatisfactory score, the course(s) necessary to make up the deficiencies.
121. **TECHNIQUES OF CALCULUS II (3:3:0)** Derivatives, integrals, applications, linear algebra. Students may take only one course for credit from Math. 66, 121, 162. Prerequisite: Math. 120.
161. **ELEMENTARY CALCULUS WITH ANALYTIC GEOMETRY I (3:3:0)** Derivatives, differentials, applications; integrations, applications; analytic geometry. Students may take only one course for credit from Math. 65, 120, 161, 161A. Prerequisite or concurrent: satisfactory scores on both the algebra and trigonometry proficiency examinations or, in the case of unsatisfactory scores, the course(s) necessary to make up the deficiencies.
162. **ELEMENTARY CALCULUS WITH ANALYTIC GEOMETRY II (3:3:0)** Derivatives, integration, applications, analytic geometry, infinite series. Students may take only one course for credit from Math. 66, 121, 162. Prerequisite: Math. 161.
200. **NUMBER SYSTEMS (3:3:0)** Introduction to sets and logic, properties of the natural numbers, integers, rational and real numbers, algorithms, applications to geometry. For elementary education students only.
240. **INTERMEDIATE CALCULUS WITH APPLICATIONS I (3:3:0)** Functions of two variables; the chain rule; vectors in space; double and triple integrals. Prerequisite: Math. 162.
250. **DIFFERENTIAL EQUATIONS (3:3:0)** Ordinary differential equations, applications, solutions by series. Students may take only one course for credit from Math. 250 and Math. 383. Prerequisite: Math. 240.
260. **MATRICES AND STATISTICS (3:3:0)** Systems of linear equations; matrix algebra; determinants; eigenvalues and eigenvectors; applications to differential equations; statistics. Prerequisite: Math. 162.
263. **INTRODUCTION TO LINEAR ALGEBRA (3:3:0)** Systems of linear equations, vector spaces, matrices, linear transformations, change of basis, determinants, characteristic roots and vectors. Prerequisite: Math. 162.
351. **INTRODUCTION TO VECTOR ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS (3:3:0)** Integral vector calculus, Fourier series, partial differential equations. Prerequisite: Math. 250. Students who have passed A.M. 451 may not schedule this course.
800. **BUSINESS MATHEMATICS (3:3:0)** Review of arithmetic, decimals, fractions, percentages, interest, and discounts; introduction to algebraic techniques; applications to business computations.
- 801-802. **TECHNICAL MATHEMATICS (3:3:0 each)** Elements of algebra and trigonometry for students in two-year technical programs. Prerequisites: 1 unit in algebra, 1 unit in plane geometry.
803. **TECHNICAL CALCULUS (3:3:0)** Selected introductory topics from analytic geometry, differential calculus, integral calculus. Prerequisites: Math. 801, 802.

## MECHANICAL ENGINEERING TECHNOLOGY (M E)

800. **MECHANISMS (2:0:4)** Motion in machine elements; strength and properties of materials; design of machine elements. Prerequisite: E.Mch. 811.
805. **KINEMATICS (3:2:3)** Graphical and analytical studies of relative motions, instant centers, velocity and acceleration in plane motions, slider crank mechanisms, cams, gears, gear trains, and flexible connectors. Prerequisites: E.G. 1, E.Mch. 811.
807. **HEAT TRANSFER (3:3:0)** Basic principles of conduction, convection, and radiation, emphasizing practical applications.
810. **PRODUCT DESIGN (3:1:6)** Design of machine elements including levers, bearings, shafts, clutches, springs, and gears; selection of ball bearings and belts; design of small mechanical devices. Prerequisites: E.Mch. 813, M.E. 805.

830. **SELECTED TOPICS IN MECHANICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in mechanical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

880. **AIR POLLUTION ANALYSIS INSTRUMENTATION (8)** Principles and applications of instruments for measuring particle and gaseous pollutants; theory, installation, operation, maintenance, and related instrumentation. Prerequisite: Math. 803 or one course in college mathematics.

881. **ELEMENTARY THERMO AND FLUID DYNAMICS (2:2:0)** Basic problems in compressible fluid flow. Laws of dynamics and thermodynamics, mechanical properties of fluids, elementary heat transfer. Prerequisites: Math. 803, Phys. 150.

882. **AIR RESOURCE MANAGEMENT (2:2:0)** Introduction to air pollution. Pollutants, sources, effects, air monitoring systems, air quality criteria and standards, governmental control programs and procedures.

883. **AIR POLLUTION ANALYSIS INSTRUMENTATION (3:2:1)** Fundamentals of chemistry, electronics, fluid flow, and small particle technology as applied to air pollution instrumentation. Prerequisites: Chem. 13, Phys. 150.

884. **SAMPLING AND MONITORING PROGRAM (2:0:4)** Instrumentation and site selection, field data acquisition for major air pollutants, data analysis and evaluation.

## **METALLURGICAL ENGINEERING TECHNOLOGY (MET E)**

800. **METALLURGICAL LABORATORY PRACTICE (4:2:4)** Instruction and practice in various metallurgical techniques. Prerequisite: Chem. 11. Prerequisite or concurrent: Phys. 150.

801. **PRINCIPLES OF EXTRACTIVE METALLURGY (2:2:0)** An introduction to several metals extraction processes using a problem-solving approach. Prerequisite: Chem. 12.

802. **PHYSICAL METALLURGY (3:2:2)** Structures of metals and alloys; structure manipulations; structure-property relationships. Prerequisites: Chem. 12, Phys. 150, Math. 802, Met.E. 800.

803. **MATERIALS TESTING (3:1:2)** Applications of testing procedures to determine properties of inorganic materials.

804. **FERROUS METALLURGY (3:2:2)** Making, shaping, and heat treatment of cast irons and steels. Prerequisites: Chem. 12, Met.E. 800.

805. **NONFERROUS METALLURGY (3:2:2)** Extraction of nonferrous metals from their ores and subsequent compositional adjustment by refining and alloying. Prerequisites: Chem. 12, Met.E. 800.

806. **SUMMER FIELD PRACTICE (3)** Practical experience in the metallurgical industries.

807. **PLANT TRIPS (1:0:3)** Plant trips to metals industries; classroom discussion with metallurgists concerning their work, and the role of the metallurgical associate. Spring term, odd years.

## **METEOROLOGY (METEO)**

303. **INTRODUCTORY METEOROLOGY (3:2:2)** Nontechnical treatment of fundamentals of modern meteorology; effect of weather and climate on man and his activities. A student who took Meteo. 300 or 304 may take this course for 1 credit only.

## **MICROBIOLOGY (MICRB)**

1. **INTRODUCTORY MICROBIOLOGY (3:3:0)** Elementary principles of microbial and viral interrelationships, morphology, and physiology; relation to food, water, soil, industry, and disease processes. Prerequisite: Chem. 12.

## COURSE DESCRIPTIONS

2. **INTRODUCTORY MICROBIOLOGY LABORATORY (2:0:4)** Qualitative and quantitative techniques with regard to recognition of bacteria and their processes on a microscopic, colonial, and physiological basis. Prerequisite or concurrent: Micrb. 1. Prerequisite: Chem. 12.

6. **ELEMENTARY MICROBIOLOGY (2:2:0)** Importance of microorganisms in public health and disease, agriculture and industry; descriptive course for nontechnical students.

7. **ELEMENTARY MICROBIOLOGY LABORATORY (1:0:2)** Selected techniques with regard to recognition and enumeration of bacteria; effects of chemical and physical agents on microorganisms. Prerequisite or concurrent: Micrb. 6.

101. **MEDICAL MICROBIOLOGY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15)** Procedures and techniques used to isolate and diagnose clinically significant organisms such as bacteria, fungi, and other human parasites. Prerequisites: Micrb. 1, 2.

102. **HEMATOLOGY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15)** Theoretical and practical aspects of hematological diagnostic studies related to erythrocyte and leukocyte disorders in man.

801. **CLINICAL LABORATORY ORIENTATION FOR MEDICAL LABORATORY TECHNICIANS (8:5:15)** Introduction to basic principles of clinical laboratory work, including the collection, handling, and preparation of biological samples.

## MINERAL PROCESSING (MN PR)

61. **INTRODUCTION TO COAL PREPARATION (3:3:0)** Theory and application of modern coal preparation practice. Sampling, crushing, sizing, gravity concentration, flotation, dewatering, drying; pollution control; flowsheets.

## MINING (MNG)

23. **MINERAL LAND AND MINE SURVEYING (3:0:9)** Surveying theory and practice applied to mineral lands and mines; traversing, leveling, mapping, shaft plumbing; stope, room, and development surveying. Prerequisite: E.G. 11, ½ unit of secondary school trigonometry.

30. **INTRODUCTION TO MINING ENGINEERING (3:2:3)** Examination, development, and exploitation of mineral deposits in case studies of mineral deposits and mines; unit operations, cycling, equipment, methods.

## MINING TECHNOLOGY (MNG T)

800. **MINING TECHNOLOGY ORIENTATION (1:0:2)** Films, slides, and lectures to acquaint the student with the coal mining industry and its impact on society.

801. **COAL MINING TECHNOLOGY (3:2:3)** Analysis of coal mining systems; integration of unit operations and mining methods for efficient mine production.

802. **MINE VENTILATION (3:2:3)** Quality and quantity analysis and control of mine atmosphere. Prerequisites or concurrent: Chem. 11, Phys. 150, Mng.T. 801.

803. **STRATA CONTROL (3:2:3)** Fundamentals of stresses and strains in rocks; virgin and concentrated stresses; roof support, subsidence, bursts, and stability control. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Mng.T. 801.

804. **MINE PLANT TECHNOLOGY (3:2:3)** Electrical systems in mines; mechanical power applications and materials handling systems. Prerequisite: Phys. 150.

805. **MINE SYSTEMS TECHNOLOGY (3:2:3)** Quantitative methods of work measurement and their application to production and method study problems related to mines. Prerequisite: Mng.T. 801.

806. **MINE MANAGEMENT AND LAW (3:3:0)** The problems of the individual in coal mine management in relation to environment, employer, union, and law.



807. **ELECTRICAL MINE MACHINE CIRCUITS (3:2:3)** Topics of electrical power fundamentals, power and control circuits, and motors and their mine applications will be covered. Prerequisite: Mng.T. 804.
808. **MINE POWER DISTRIBUTION (3:2:3)** Topics of high voltage circuits, underground transmission, power stations, power conversion, safety regulations and power devices will be covered. Prerequisite: Mng.T. 804.
809. **MINE MACHINERY HYDRAULICS (3:2:3)** Topics of basic hydraulic principles and their application to mining and mine machinery will be covered. Prerequisites: Math. 802, Phys. 150.
810. **MINE MACHINE DYNAMICS (3:2:3)** Topics on basic machines and their application to the principles of mine machine operation will be covered. Prerequisites: E.Mch. 811, Phys. 150.
811. **PRACTICUM IN MINE MAINTENANCE (3:0:9)** Field and shop techniques in procedures of electrical, mechanical and hydraulic phases of mine maintenance will be covered. Prerequisites: Mng.T. 804, Phys. 150.
815. **SURFACE MINING TECHNOLOGY (3:2:3)** Analysis of surface mining systems; integration of unit operations and equipment utilization for efficient operation. Prerequisite: Mng.T. 800.
816. **ELEMENTS OF SURFACE MINE DESIGN (3:2:3)** Exploration methods, pit planning, and design; drilling and fragmentation; loading and haulage systems; and slope stability. Prerequisite: Mng.T. 815.
817. **SURFACE MINING PRODUCTION TECHNOLOGY (3:2:3)** Application of time study and work measurement to surface production. Efficiency of equipment usage and equipment utilization scheduling. Prerequisite: Mng.T. 815.
818. **SURFACE MINING HYDROLOGY (3:3:0)** Water control and treatment; hydrologic studies before and after mining; impoundments and water treatment. Prerequisites: Chem. 11; Geosc. 1 or 20 or 101.
819. **RECLAMATION TECHNOLOGY (3:3:0)** Spoil-bank reclamation and contour grading; revegetation and reclaimed land utilization.

## **MUSIC (MUSIC)**

5. **THE FUNDAMENTALS OF MUSIC APPRECIATION (3:3:0)** Recitation and lectures with recorded examples of melody, harmony, rhythm, vocal and instrumental timbre, form, and program and absolute music.

## **MUSIC EDUCATION (MU ED)**

806. **MUSIC SKILLS FOR RECREATION LEADERS (3:3:0)** Theories and practice in music activities found in group and club settings. Appreciation, leadership techniques, and fundamental musicology.

## **NUCLEAR ENGINEERING TECHNOLOGY (NUC E)**

800. **NUCLEAR AND ATOMIC SCIENCE (2:2:0)** Introduction to the theories of atomic and nuclear structure and electromagnetic radiation. Prerequisites: Phys. 151, Math. 803.
801. **RADIOLOGICAL SAFETY (2:2:0)** Discussion of basic radiation dose units, radiation monitoring techniques, biological effects of radiation, and AEC regulations. Prerequisite or concurrent: Nuc.E. 800.
802. **ELEMENTS OF NUCLEAR TECHNOLOGY (2:2:0)** Study of nuclear radiations, nuclear interactions, neutron diffusion, and reactor materials. Prerequisite: Nuc.E. 800.
803. **ELEMENTS OF NUCLEAR POWER GENERATION (3:3:0)** Survey of various reactor types with emphasis on fuel heat removal and power generation, shielding, fuel fabrication and reprocessing. Prerequisite: Nuc.E. 802.



## COURSE DESCRIPTIONS

804. INTRODUCTION TO REACTOR TECHNOLOGY (3:3:0) Steady state reactor theory, kinetic behavior of reactors and reactor control systems. Prerequisite: Nuc.E. 802.
805. PRINCIPLES OF MEASUREMENT (3:2:2) A study of measurement in the nuclear industry, including the instruments used, accuracy of measurement, and statistical justification. Prerequisites: E.E. 814, Phys. 151.
812. NUCLEAR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of radiation measurements and the diversified application of nuclear techniques. Prerequisites: Nuc.E. 801, 802.
814. REACTOR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of basic reactor experiments, control rod calibration, critical experiment, etc. Emphasis placed upon reactor operations. Must be taken with Nuc.E. 804. Prerequisite: Nuc.E. 801.
830. SELECTED TOPICS IN NUCLEAR ENGINEERING TECHNOLOGY (3) Individual or group work in nuclear engineering technology for students with specific occupational objectives. Prerequisite: fourth-term standing.

## \*NURSING (NURS)

800. FOUNDATIONS OF TECHNICAL NURSING I (6:4:8) Role of the nurse in society and the health care team; nursing techniques used to meet basic patient needs.
801. FOUNDATIONS OF TECHNICAL NURSING II (6:4:8) Nursing techniques utilized to meet the needs of the patient undergoing diagnosis or basic medical or surgical treatment. Prerequisite or concurrent: Biol. 29, 41, Micrb. 6, Nurs. 800.
802. TECHNIQUES OF NURSING IN CHILDHOOD (7:3:16) Application of nursing techniques to the health needs of persons in the 2-week-old to 19-year-old age group. Prerequisite: Nurs. 801.
803. TECHNIQUES OF NURSING THE MATURE PATIENT (7:3:16) Application of nursing techniques to the health needs of persons in the 20-year-old to 40-year-old age group. Prerequisite: Nurs. 801.
804. TECHNIQUES OF NURSING THE PATIENT IN THE MIDDLE YEARS (7:3:16) Utilization of nursing techniques to meet the health needs of persons in the 41-year-old to 65-year-old age group. Prerequisite: Nurs. 801.
805. TECHNIQUES OF NURSING THE PATIENT IN SENESCENCE (7:3:16) Application of nursing techniques to meet the health needs of persons over 65 years of age. Prerequisite: Nurs. 801.
806. NURSING SEMINAR (3:3:0) Current issues in nursing, and adjustments of the student to the role of the graduate technical nurse. Prerequisite or concurrent: Nurs. 801.

## NUTRITION (NUTR)

150. ELEMENTARY NUTRITION (2:2:0) Fundamentals of nutrition and its relation to human health. Students who have passed Nutr. 351 may not schedule this course.
351. INTRODUCTORY PRINCIPLES OF NUTRITION (3:3:0) The nutrients: food sources and physiological functions as related to human growth and well-being throughout life; current nutrition issues. Students who have passed Nutr. 150 may not schedule this course.
800. NORMAL DIET MODIFICATIONS (4:3:3) Modifications of normal diet to meet therapeutic needs in patient care and rehabilitation.
801. NUTRITION COMPONENT OF THE FOOD SERVICE SYSTEM (3:3:0) Introduction to basic nutrition principles and their application in a food service system.

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\*Admission to the Nursing program is closed.

## PHILOSOPHY (PHIL)

1. INTRODUCTION TO LOGIC (3:3:0) Principles of correct thinking; deductive and inductive inference; use and misuse of language in reasoning.
2. INTRODUCTION TO PHILOSOPHY (3:3:0) Evaluation of the intellectual and moral tone of the present day through a study of existentialism and other recent philosophies. Prerequisite: fourth-term standing.
4. BASIC PROBLEMS OF PHILOSOPHY (3:3:0) How important philosophers have treated the perennial problems of knowledge, reality, free will, etc.
12. ELEMENTS OF SYMBOLIC LOGIC (3:3:0) How to translate arguments into symbolic language and test them for validity using truth-tables and deduction rules. For nonscience majors.
103. MAN AND MORAL VALUE (3:3:0) Freedom, choice, and obligation in conduct; values in a scientific age; the pursuit of happiness and other goals of life. Prerequisite: fourth-term standing.
108. SOCIAL AND POLITICAL PHILOSOPHY (3:3:0) Philosophical analysis of political and communal order; ideal standards of individual and group action within practical structure of social obligation. Prerequisite: fourth-term standing.
111. ORIENTAL PHILOSOPHY (3:3:0) Outstanding contributions to philosophic and religious thought in the Near East, India, and China. Prerequisite: fourth-term standing.
212. SYMBOLIC LOGIC (3:3:0) The logic of classes, propositions, relations, and quantification; the nature and properties of formal systems. Intended primarily for science-oriented students. Prerequisite: fourth-term standing.

## PHYSICAL EDUCATION (PH ED)

- \*5. PHYSICAL EDUCATION (1:0:3 per term) Activities to develop physical and recreational skills; beginning swimming required of those who fail swim-safety test. Selection from archery, badminton, bowling, canoeing, cross-country skiing, dancing, fencing, figure skating, golf, handball, hunter safety, orienteering, racquetball, riflery, sailing, scuba, squash, survival training, swimming, tennis, volleyball, weight training, and others. Typically, two activities per term.
9. LIFE SAVING AND WATER SAFETY (1:0:3) Course outlined by the American Red Cross; prepares the student for the Senior Life Saving examination. Prerequisite: passing of qualifying swimming test.
801. LIFETIME SPORTS (1:0:3) Basic understanding of the fundamentals of lifetime sports and the leadership and supervision of such sports.
802. SWIMMING (1:0:3) Fundamentals of swimming and the supervision of aquatic facility programs.
803. GAMES FOR CHILDREN (1:0:3) Low organized and lead-up games with emphasis on age group differences.
804. DANCE AND GYMNASTICS (1:0:3) Understanding dance forms and rudiments of gymnastics.
805. TEAM SPORTS (1:0:3) Basic understanding of the fundamentals of team sports, and the leadership and supervision of such sports.
806. OFFICIATING (1:0:3) Theory and practice of officiating games and sports.
807. ADAPTED ACTIVITIES (1:0:3) Adaptation of activities and methods of presentation of games for the handicapped.

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\*Must be repeated for a total of 3 credits to satisfy University Baccalaureate Degree Requirements.

## PHYSICAL SCIENCE (PH SC)

7. **PHYSICAL SCIENCE (3:3:0)** Development of physics, including modern physical concepts and their relationship to the careers of physical scientists. May not be scheduled by students who have received credit for Phys. 201 or 215.
8. **PHYSICAL SCIENCE (3:3:0)** Selected concepts of chemistry showing their development, interrelationship, and present status. May not be scheduled by students who have received credit for Chem. 11 or 12.

## PHYSICIAN'S ASSISTANT (P A)

800. **MECHANISMS OF BODY FUNCTIONS I (2:1:2)** Introduction of principles of anatomy, physiology, and biochemistry relating to structure and function of cells and tissues.
801. **MECHANISMS OF BODY FUNCTIONS II (2:1:2)** Continuation of P.A. 800. An integration of biological principles relating to structure and function of selected organ systems. Prerequisite: P.A. 800.
802. **MECHANISMS OF BODY FUNCTIONS III (2:1:2)** Continuation of P.A. 801. An investigation of biological principles relating to structure and function of selected organ systems. Prerequisite: P.A. 801.
805. **MICROBIOLOGY (2:2:0)** Study of common fungi, bacteria, and viruses with regard to colonization, growth, nutrition, and cultivation, as they relate to common diseases.
807. **HUMAN GENETICS (1:1:0)** Basic principles of classical genetics as they relate to problems presented in a primary care setting.
810. **HUMAN BEHAVIOR: PRINCIPLES AND HEALTH PROBLEMS I (2:2:0)** Introduction to the principles of behavioral science for understanding behavior and behavior modification necessary for health maintenance.
811. **HUMAN BEHAVIOR: PRINCIPLES AND HEALTH PROBLEMS II (2:1:2)** Continuation of P.A. 810. Principles of behavioral science for understanding behavior and behavior modification necessary for health maintenance. Prerequisite: P.A. 810.
820. **PATIENT-ORIENTED CARE I—RELATING TO THE PATIENT (1:0:2)** Development of the comprehensive approach to patient care. An introduction to interpersonal skills, interviewing and data gathering.
821. **PATIENT-ORIENTED CARE II—PROBLEM ANALYSIS (2:2:0)** Continuation of P.A. 820. An introduction to health care systems, the natural history of disease, data recording, data synthesis. Prerequisite: P.A. 820.
822. **PATIENT-ORIENTED CARE III—THE PATIENT, THE PRACTICE, AND THE COMMUNITY (2:2:0)** Continuation of P.A. 821. An introduction to disease patterns, epidemiologic terminology, individual and environmental problems, and resources in the community context. Prerequisite: P.A. 821.
830. **MEDICAL-SURGICAL PROBLEMS I (2:1:2)** Introduction to the principles of assessment and management of selected medical-surgical problems in a primary care setting.
831. **MEDICAL-SURGICAL PROBLEMS II (2:1:2)** Continuation of P.A. 830. Introduction to the principles of assessment and management of selected medical-surgical problems. Prerequisite: P.A. 830.
832. **MEDICAL-SURGICAL PROBLEMS III (2:1:2)** Continuation of P.A. 831. Introduction to the principles of assessment and management of selected medical-surgical problems. Prerequisite: P.A. 831.
840. **DIAGNOSTICS (1:0:2)** An introduction to basic laboratory, radiological, and electrocardiograph studies used in a primary care setting.
850. **THERAPEUTICS (2:1:2)** An introduction to basic applied clinical therapeutics, with emphasis on significant modalities used in the primary care setting.



860. **EMERGENCY MEDICINE (2:2:0)** Introduction to the initial evaluation and management of common problems seen in an emergency room setting. Prerequisite: P.A. 820.
870. **PEDIATRICS (2:2:0)** An introduction to the basic principles used in caring for normal children and children with specific problems. Prerequisite: P.A. 820.
880. **PRACTICUM IN PRIMARY HEALTH CARE DELIVERY I (10)** Emphasis on health maintenance, periodic appraisal of adults, evaluation of common medical-surgical problems, and implementation of therapeutic modalities.
881. **PRACTICUM IN PRIMARY HEALTH CARE DELIVERY II (10)** Emphasis on health maintenance, periodic appraisal of children, evaluation of common medical-surgical problems, and implementation of therapeutic modalities.
882. **PRACTICUM IN PRIMARY HEALTH CARE DELIVERY III (10)** Emphasis on health maintenance, periodic appraisal of adults, evaluation of common medical-surgical and behavioral problems, and implementation of therapeutic modalities.

## PHYSICS (PHYS)

150. **TECHNICAL PHYSICS (3:2:2)** Elementary treatment of topics in mechanics, heat, wave motion, and sound leading toward an understanding of technical applications. Prerequisite: 1½ units of algebra. Prerequisite or concurrent: Math. 801.
151. **TECHNICAL PHYSICS (3:2:2)** Elementary treatment of topics in electricity, light, and modern physics leading toward an understanding of technical applications. Prerequisite: Phys. 150.
201. **GENERAL PHYSICS (4:4:0)** Mechanics, wave motion, and sound. Prerequisite: Math. 162.
202. **GENERAL PHYSICS (4:3:2)** Electricity and magnetism. Prerequisite: Phys. 201.
203. **GENERAL PHYSICS (3:3:0)** Heat, optics, and modern physics. Prerequisite: Phys. 202.
204. **GENERAL PHYSICS (4:3:2)** Heat, optics, and modern physics with laboratory. Prerequisite: Phys. 202.
215. **INTRODUCTORY PHYSICS (4:3:2)** Selected topics in mechanics, heat, and sound. Prerequisite: algebra to quadratics.
237. **INTRODUCTION TO ATOMIC AND NUCLEAR PHYSICS (3:3:0)** Atomic and molecular theory, relativity, elementary particles, nuclear structure and reactions. Prerequisites: Phys. 203, 204.
265. **INTRODUCTORY PHYSICS (4:3:2)** Selected topics in light, electricity, and magnetism. Prerequisite or concurrent: Phys. 215.
297. **SPECIAL TOPICS (1-6)**

## PLANT SCIENCE (PLTSC)

801. **PRODUCTION OF HORTICULTURAL CROPS (3:2:2)** The application of scientific principles to horticultural crop production.
802. **USE OF AGRICULTURAL CHEMICALS (3:2:2)** Principles and practices relating to safe and effective control of weeds, insects, and plant diseases through use of chemical toxicants.

## POLITICAL SCIENCE (PL SC)

1. **AMERICAN NATIONAL GOVERNMENT (3:3:0)** Development and nature of American political culture; constitutional and structural arrangements; policy-making processes; sources of conflict and consensus.
3. **GOVERNMENT AND POLITICS IN MODERN SOCIETY (3:3:0)** Introduction to study of government and politics. Normative and empirical theories; governmental functions in modern communities; representative structures and processes.



## COURSE DESCRIPTIONS

14. INTERNATIONAL RELATIONS (3:3:0) Characteristics of modern nation-states and forces governing their international relations; nationalism; imperialism; diplomacy; current problems of war and peace. Credit will not be given for both this course and Int.U. 200.

20. COMPARATIVE POLITICS—WESTERN EUROPE (3:3:0) Comparative analysis of political cultures, interest groups, parties, and decision-making processes in principal Western European political systems.

## POULTRY SCIENCE (PTYSC)

801. POULTRY PRODUCTION (2:1:2) Practical aspects of poultry, nutrition, management, disease control, and marketing in the production of broilers, eggs, and turkeys.

## PSYCHOLOGY (PSY)

2. PSYCHOLOGY (3:3:0) Introduction to general psychology; principles of human behavior and their applications.

13. INTRODUCTION TO DEVELOPMENTAL PSYCHOLOGY (3:3:0) Developmental principles; physical growth; linguistic, intellectual, emotional, and social development from infancy to maturity. Prerequisite: Psy. 2.

37. MENTAL HEALTH (3:3:0) Maintaining adjustment, developing a well-balanced personality; behavior disorders and their treatment. May not be used as prerequisite for any course in psychology. Not open to psychology majors or those who have credit for Psy. 437.

102. RESEARCH METHODS IN PSYCHOLOGY (4:1:6) Designed to develop skills in nonlaboratory research techniques, particularly methods used in field studies and sample survey research. Prerequisites: Psy. 2, Stat. 200.

## QUANTITATIVE BUSINESS ANALYSIS (Q B A)

101. INTRODUCTION TO QUANTITATIVE BUSINESS ANALYSIS (3:3:0) Introduction to quantitative methods for conceptualizing business and management problems. Prerequisite: Math. 18 or 120.

102. ELEMENTARY BUSINESS STATISTICS (3:3:0) Statistical inference; estimation, hypothesis testing, testing, correlation and regression; application of statistical techniques to economic and business problems. Prerequisite: Q.B.A. 101.

801. ELEMENTARY BUSINESS STATISTICS (3:3:0) Collection, tabulation, measurement, presentation, and interpretation of quantitative material. Prerequisite: fourth-term standing.

## RADIOLOGIC TECHNOLOGIST RADIOGRAPHER (R T R)

1. HISTORY OF RADIOLOGY; ELEMENTARY RADIATION PROTECTION; MEDICAL ETHICS (1:2:6) History of radiology field, basic principles of radiation protection, applications of medical ethics, base office procedures, departmental structure.

20. MEDICAL TERMINOLOGY; RADIOGRAPHIC POSITIONING I (1:3:5) Introduction to the medical profession's language; basic positional terminology, emphasis on skeletal positioning with skull introduction.

30. RADIOGRAPHIC EXPOSURE I; FILM CRITIQUE I (1:3:5) Preliminary exposure factors concerning radiographic imaging; evaluation of radiographic films.

40. RADIOGRAPHIC POSITIONING II: CONTRAST PROCEDURES; NURSING PROCEDURES (5:3:13) Body system positionings, radiologic applications on contrast media, nursing procedures pertinent to radiologic technology. Prerequisite: R.T.R. 20.

50. **RADIOGRAPHIC EXPOSURE II (1:2:5)** Emphasis on problem solving and formation of technique chart. Prerequisite: R.T.R. 30.
60. **DARKROOM CHEMISTRY; FILM CRITIQUE II (1:3:5)** Film composition, manifestation of latent image and film processing techniques; continuation evaluation of radiographic films. Prerequisites: Chem. 11, R.T.R. 30.
70. **RADIOGRAPHIC POSITIONING III (1:2:6)** Review of skeletal, skull, and body systems; emphasis on pediatric, geriatric, psychiatric, and intra-oral radiography. Prerequisite: R.T.R. 40.
80. **SPECIAL PROCEDURES; REGISTRY REVIEW (1:5:14)** Invasive contrast procedures pertinent to radiology. Tomography, paradiologic imaging modalities; review for registry examination. Prerequisite: R.T.R. 70.
90. **MEDICAL AND SURGICAL DISEASES; REGISTRY REVIEW II (1:3:14)** Review for registry examination, definition of various diseases, and pathology pertaining to bodily systems. Prerequisites: Biol. 41, R.T.R. 80.

## **READING, COMMUNICATION, AND LANGUAGE EDUCATION (RCLED)**

5(A,B). **COLLEGE READING SKILLS IMPROVEMENT (2-4)** Improving reading comprehension, vocabulary, rate, study skills, and integrating these more efficiently in course work.

*Unit A:* Average or better readers seeking advanced work or preparation for specific goals.

*Unit B:* Limited to students needing developmental reading instruction and recommended on the basis of reading entrance test scores.

## **REAL ESTATE (R EST)**

800. **REAL ESTATE PRINCIPLES (3:3:0)** Nature of the real estate market; introduction to the functions performed in the real estate business.
810. **REAL ESTATE SALES (3:3:0)** Principles underlying the sale of real estate; the use of selling tools and procedures in the analysis of customers' needs.
830. **REAL ESTATE FINANCE (3:3:0)** Basic principles of real estate finance; sources of funds for financing real estate.

## **RECREATION AND PARKS (RC PK)**

120. **LEISURE AND HUMAN EXPERIENCE (3:3:0)** Introduction to leisure in historical and contemporary perspective. Relationships between leisure and other social institutions. Determinants of leisure behavior.
130. **OUTDOOR LIVING SKILLS (1:0:3)** Direct experience with outdoor living skills and backpacking; weekend campout. American Camping Association's Advanced Campcraft certification skills covered. Prerequisite: American Red Cross Standard First Aid and Personal Care certificate recommended.
150. **THE SCOPE OF RECREATION AND PARKS SERVICES (1)** Observation of and exposure to components, programs, and agencies which make up the field of recreation and parks services.
190. **PERSPECTIVES FOR THE RECREATION AND PARKS PROFESSIONAL (3:2:2)** Historical view of recreation and parks movement in the U.S.; observation and analysis services; investigation of professional preparation.
230. **CAMP COUNSELING (2:1:2)** Counselor skills and responsibilities for the organized camp.
236. **THEORY AND PRACTICE OF RECREATION LEADERSHIP (3:2:2)** Methods and materials; experience in recreation leadership with different age groups and in a variety of school and community settings.

## **COURSE DESCRIPTIONS**

850. **FIELD PRACTICUM (3)** Observation and participation in a recreation system, hospital, youth-serving agency, or other setting.

856. **RECREATION PROGRAM PLANNING (3:3:0)** The theory and exploration of program planning in the various recreation settings. Policies and philosophies pertinent to the program areas.

875. **INTRODUCTION TO THERAPEUTIC RECREATION (3:3:0)** Recreation for the mentally retarded, physically handicapped, emotionally disturbed, the aged, and the culturally different in institutions and community settings.

877. **THERAPEUTIC RECREATION PROGRAM (3:3:0)** Critical examination of therapeutic recreation leader's role in relation to other human services, activity analysis and counseling techniques. Prerequisite: Rc.Pk. 875.

## **RETAILING (RTL)**

833. **SELECTION AND USE OF TEXTILES (3:2:4)** Selection, use, and care of textile products as affected by fiber, yarn, and fabric construction, and finishing processes.

834. **FORCES OPERATING IN THE CLOTHING AND TEXTILE INDUSTRY (2:2:0)** Description of ways in which operations of the various segments of the clothing and textiles industry impinge on retailing. Prerequisites: Mktg. 804, 805, 806.

840. **MANAGEMENT IN THE HOME (3:3:0)** The principles of decision making, work simplification, use of equipment, and home safety applied to family management.

850. **DISPLAY TECHNIQUES (2:1:3)** Display as visual communication, emphasizing the techniques related to merchandising and art. Prerequisite: an art or art appreciation course.

## **SOCIAL SCIENCE (SO SC)**

1. **THE URBANIZATION OF MAN: A SOCIAL SCIENCE PERSPECTIVE (3:3:0)** An overview of the social sciences, including an interdisciplinary analysis of the urban process.

2. **CONTEMPORARY MAN AND SOCIETY (3:3:0)** Selected contemporary issues in the perspective of history, sociology, psychology, economics, and political science.

110. **INTRODUCTION TO CONTEMPORARY AFRICA (3:3:0)** Consideration of influences and forces at work; leaders, elites, and groups. Analysis of problems and issues in Africa.

## **SOCIAL STUDIES (SO ST)**

800. **HUMAN CULTURES AND THE INDIVIDUAL (3:3:0)** Basic components of human cultures, with emphasis upon specific elements of American culture.

801. **CRITICAL AND VISIONARY CONCEPTS OF SOCIETY (3:3:0)** Critical and visionary concepts of society from the Renaissance to the present, including major theorists, commentators, and imaginative writers.

## **SOCIOLOGY (SOC)**

1. **INTRODUCTORY SOCIOLOGY (3:3:0)** Social structure; basic human institutions; analysis of social processes; major social forces.

3. **INTRODUCTORY SOCIAL PSYCHOLOGY (3:3:0)** Culture, conduct, and the sociogenesis of behavior.

5. **SOCIAL PROBLEMS (3:3:0)** Poverty, delinquency, crime; family discord; industrial, race, and nationality conflicts; mental disorders.

7. **METHODOLOGY OF SOCIOLOGY (3:3:0)** Introduction to the nature, collection, and interpreta-



tion of materials used by social scientists in research and publication. Prerequisite: 3 credits in sociology.

30. SOCIOLOGY OF THE FAMILY (3:3:0) Family structure and interaction; functions of the family as an institution: cross-cultural comparisons. Prerequisite: 3 credits in sociology.

## SOLAR TECHNOLOGY (S T)

801. INTRODUCTION TO SOLAR TECHNOLOGY (2:1:2) Introduction to solar technology from the standpoint of history, ecology, and energy.

802. SOLAR COLLECTORS (3:2:2) Analysis and application of air-type and fluid-type solar collectors. Prerequisites: A.E. 803, M.E. 881, and S.T. 801.

803. HEAT STORAGE AND DISTRIBUTION SYSTEMS (3:2:2) Analysis and application of heat storage and distribution systems; layout of systems. Concurrent: S.T. 802.

804. ANALYSIS OF SOLAR HEATING AND COOLING SYSTEMS (3:1:5) Comprehensive analysis and application of solar heating and cooling systems. Calculations and layout. Prerequisites: A.E. 809, S.T. 802, 803.

805. ECONOMICS OF SOLAR TECHNOLOGY SYSTEMS (3:2:2) Economic analyses of active and passive solar heating and cooling systems. Prerequisite: S.T. 801.

## SPANISH (SPAN)

1. ELEMENTARY SPANISH (4:3:2) Audio-lingual approach to basic Spanish; writing.

2. ELEMENTARY SPANISH (4:3:2) Audio-lingual approach to basic Spanish continued; writing. Prerequisite: Span 1.

3. INTERMEDIATE SPANISH (4:3:2) Audio-lingual review of structure; writing; reading. Prerequisite: Span. 2.

131. IBERO-AMERICAN CIVILIZATION (3:3:0) Spanish American and Brazilian life from the Conquest to the present: literature, art, the indigenous heritage, and contemporary problems.

## SPEECH COMMUNICATION (SPCOM)

200. EFFECTIVE SPEECH (3:3:0) Introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.

*Unit A.* Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation.

*Unit B.* Principles of communication, implemented through group problem solving, with some attention to formal speaking and message evaluation.

*Unit C.* Principles of communication, implemented through analysis and evaluation of messages, with some attention to formal speaking and group discussion.

280. ORAL INTERPRETATION (3:3:0) Principles of oral interpretation of the printed page with practice in oral reading of poetry, prose, and drama.

330. STUDIO PRACTICUM (1-3) Supervised experience in the arts and crafts of radio and television production. Prerequisite: Sp.Com. 325 or 340.

801. SURVEY OF BROADCASTING (3:3:0) Introduction to broadcasting: history, organization, responsibilities, laws, rules and regulations.

802. RADIO AND TELEVISION ANNOUNCING (3:1:4) The study and application of oral communication techniques for radio and television announcing, including basic operation of related equipment.

803. BASIC WRITING FOR RADIO AND TELEVISION (3:1:4) Techniques of writing for radio and television stations, emphasizing copy and news writing. Prerequisite: Engl. 10.



## COURSE DESCRIPTIONS

804. **RADIO PROGRAMMING, PRODUCTION, AND PERFORMANCE (3:1:4)** Introduction to basic elements of radio programming and production, including developing, producing, and performing in radio announcements and programs. Prerequisites: Sp.Com. 801, 802, 803.

805. **TELEVISION PROGRAMMING, PRODUCTION, AND PERFORMANCE (3:1:4)** Introduction to basic elements of television programming and production, including developing, producing, and performing in television announcements and programs. Prerequisite: Sp.Com. 804.

830. **DIRECTED STUDIES (1-3)** Individual or group work in broadcast studies and/or projects for second-year students with specific occupational objectives. Prerequisite: Sp.Com. 805 and sixth-term standing.

## STATISTICS (STAT)

200. **ELEMENTARY STATISTICS (4:3:2)** Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. Prerequisite: 2 units in algebra.

318. **ELEMENTARY DISCRETE PROBABILITY (3:3:0)** Discrete probability spaces; random variables; expectations; independence and dependence; introduction to Markov chains and other stochastic processes. Prerequisite: Math. 17 or 65 or 120 or 161.

## TELECOMMUNICATIONS (TELCM)

840. **INTRODUCTION TO TELECOMMUNICATIONS SYSTEMS (2:2:0)** Elements of telecommunications systems including telephones, transmission lines, switching, digital data, and transmission by microwave, satellite, and fiber optics.

841. **SWITCHING AND TRAFFIC (3:3:0)** Routing of telecommunications messages: characteristics, methods, and control. Prerequisite: TelCm. 840.

842. **ELEMENTARY TELECOMMUNICATIONS LABORATORY (1:0:2)** Basic measuring equipment for telecommunications systems. Prerequisite: TelCm. 840. Prerequisite or concurrent: TelCm. 841.

843. **TRANSMISSION (3:3:0)** Transmission of telecommunications information, including design problems. Prerequisites: TelCm. 841, 842.

844. **ADVANCED TELECOMMUNICATIONS LABORATORY (1:0:2)** Installation, alignment, and operation of advanced telecommunication equipment. Prerequisite or concurrent: TelCm. 843.

## THEATRE ARTS (THEA)

100. **THE ART OF THE THEATRE (3:3:0)** Forms and styles of dramatic experience; cultural functions of theatre in the past and present. For nontheatre majors only.

104. **PROCESSES OF THEATRE PRODUCTION (3:1:4)** The procedures of design, coordination, and execution of scenery, costumes, lighting, and sound for nonprofessional productions.

109. **THE DRAMATIC ARTS IN THE MASS MEDIA (3:3:0)** The place of television-radio-film drama in our culture; relationship with other art forms; standards of evaluation.

190. **THE ART OF THE CINEMA (3:3:0)** The development of cinema to its present state; principles of evaluation and appreciation; examples from the past and present.

806. **INTRODUCTION TO CREATIVE DRAMATICS (3:1:4)** Introduction and direct experience in creative dramatics and survey of children's theatre.

**WILDLIFE (WILDL)**

801. **INTRODUCTION TO WILDLIFE MANAGEMENT (3:3:0)** Basic principles of wildlife management. Introduction to general ecology and wildlife population dynamics.
803. **ANIMAL IDENTIFICATION (3:2:3)** Identification of mammals, birds, reptiles, amphibians and fishes; introduction to their life histories.
804. **WILDLIFE MENSURATION (3:2:3)** The measurement of animal populations and vegetation samples.
805. **FIELD AND LABORATORY TECHNIQUES (3:1:6)** Techniques utilized in wildlife research and management; introduction to mapping, photography, census, record keeping and measurement of population structure. Prerequisites: For. 802, Wildl. 801, 803, 804, 812, 814. Concurrent: Wildl. 806.
806. **OPERATIONAL PROCEDURES AND EQUIPMENT (2:1:3)** Summer camp for operational procedures and the operation and maintenance of wildlife equipment and facilities. Concurrent: Wildl. 805.
807. **OUTDOOR RECREATION (3:2:3)** Sociology, history, and economics of recreational demand; recreational areas and management procedures.
809. **ANIMAL CARE (3:2:3)** Care and handling of captive wild animals.
811. **AERIAL PHOTO INTERPRETATION (4:2:6)** Techniques of photo interpretation; type mapping of wildlife environments; photo censusing of wild animals.
812. **WILDLIFE FIELD SURVEYS (3:2:3)** Terrestrial measurement, methods of plotting, area determinations, cover, and type mapping.
813. **FISHERIES MANAGEMENT FOR TECHNICIANS (3:2:3)** Introduction to fisheries management, biology of fishes, aquatic ecology, use and care of equipment, habitat surveys, and management practices.
814. **HABITAT MANAGEMENT (3:0:9)** Identification, ecological characteristics, manipulation of food and cover plants. Animal needs, range and habitat analysis, and management for wildlife.

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# The Pennsylvania State University Bulletin

## Associate Degree Programs

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# 1981-1982

## The Pennsylvania State University Bulletin

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### ASSOCIATE DEGREE PROGRAMS

#### STATEMENT OF NONDISCRIMINATION

The Pennsylvania State University, in compliance with applicable federal and state equal opportunity laws and regulations governing affirmative action and nondiscrimination, does not discriminate in the recruitment, admission, and employment of students, faculty, and staff in the operation of any of its educational programs and activities as defined by law. Accordingly, nothing in this publication should be viewed as directly or indirectly expressing any limitation, specification, or discrimination as to race, religion, color, or national origin; or to handicap, age, sex, or status as a disabled or Vietnam-era veteran, except as provided by law. Any inquiries concerning this policy may be directed to the vice president for student affairs.

#### REGULATIONS SUBJECT TO CHANGE

The educational process necessitates change. This bulletin must be considered as informational and not binding on the University.

Each step of the educational process, from admission through graduation, requires continuing review and appropriate approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

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JAN 9 1981

# **\* UNIVERSITY CALENDAR**

## **\* WINTER TERM 1981**

### **NOVEMBER 1980**

30 Sunday—Arrival date

### **DECEMBER**

- 1 Monday—Orientation and advising
- 2, 3 Tuesday, Wednesday—Registration
- 4 Thursday—Classes begin 8:00 a.m.
- 20 Saturday—Christmas and New Year's recess begins 12:25 p.m.

### **JANUARY 1981**

- 5 Monday—Winter term classes resume 8:00 a.m.

### **FEBRUARY**

- 25 Wednesday—Classes end 9:55 p.m.
- 26-28 Thursday to Saturday—Final examinations

### **MARCH**

- 2 Monday—Final examinations
- 8 Sunday—Commencement

## **SPRING TERM 1981**

### **MARCH**

- 8 Sunday—Arrival date
- 9 Monday—Orientation and advising
- 10, 11 Tuesday, Wednesday—Registration
- 12 Thursday—Classes begin 8:00 a.m.

### **MAY**

- 20 Wednesday—Classes end 9:55 p.m.
- 21-23 Thursday to Saturday—Final examinations
- 25 Monday—Final examinations
- 30 Saturday—Commencement

## **SUMMER TERM 1981**

### **JUNE**

- 7 Sunday—Arrival date
- 8 Monday—Orientation and advising
- 9 Tuesday—Registration
- 10 Wednesday—Classes begin 8:00 a.m.

### **AUGUST**

- 18 Tuesday—Classes end 9:55 p.m.
- 20-22 Thursday to Saturday—Final examinations
- 29 Saturday—Commencement

## **FALL TERM 1981**

### **SEPTEMBER**

- 1 Tuesday—Arrival date
- 2-4 Wednesday to Friday—Orientation and advising
- 2-4 Wednesday to Friday—Registration
- 7 Monday—Labor Day holiday, no classes
- 8 Tuesday—Classes begin 8:00 a.m.

### **NOVEMBER**

- 16 Monday—Classes end 9:55 p.m.
- 17-20 Tuesday to Friday—Final examinations
- 26 Thursday—Thanksgiving
- 28 Saturday—Commencement

\*This calendar is subject to change without notice. Although the University makes every effort to avoid conflicts with religious holidays in preparing the calendar for an academic year, such conflicts are sometimes unavoidable. When they occur, efforts are made to make special arrangements for the students affected.

# UNIVERSITY ADMINISTRATION

JOHN W. OSWALD, A.B., Ph.D., LL.D., D.Sc., L.H.D. *President*

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WARREN R. HAFFNER, B.A. *University Registrar*

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### COLLEGE OF HEALTH, PHYSICAL EDUCATION, AND RECREATION

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### COLLEGE OF HUMAN DEVELOPMENT

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## UNIVERSITY ADMINISTRATION

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### COLLEGE OF SCIENCE

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RONALD YAVORSKY, Assoc. Bus., B.S. *Business Manager*

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THOMAS F. HOFFACKER, A.B. *Business Manager*

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## UNIVERSITY ADMINISTRATION

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TERRY K. ENGDAHL, B.A., M.S. *Assistant Director for University Relations*

VONI B. GRIMES *Business Manager*

## PENN STATE CAMPUSES

### \*UNIVERSITY PARK CAMPUS

University Park, PA 16802

Area Code 814 865-4700

### ALLENTOWN CAMPUS

Academic Building, Fogelsville, PA 18051

Area Code 215 285-4811

### ALTOONA CAMPUS

Smith Building, Altoona, PA 16603

Area Code 814 946-4321

### BEAVER CAMPUS

Brodhead Road, Monaca, PA 15061

Area Code 412 775-8830

### \*BEHREND COLLEGE

Erie (Station Road, Wesleyville), PA 16563

Area Code 814 898-1511

### BERKS CAMPUS

R.D. 5, Tulpehocken Road, P.O. Box 2150,  
Reading, PA 19608

Area Code 215 375-4211

### \*CAPITOL CAMPUS

Middletown, PA 17057

Area Code 717 783-6250

### DELAWARE COUNTY CAMPUS

25 Yearsley Mill Road, Media, PA 19063

Area Code 215 565-3300

### DuBOIS CAMPUS

College Place, DuBois, PA 15801

Area Code 814 371-2800

### FAYETTE CAMPUS

P.O. Box 519, Uniontown, PA 15401

Area Code 412 437-2801

### HAZLETON CAMPUS

Highacres, Hazleton, PA 18201

Area Code 717 454-8731

### MILTON S. HERSHEY MEDICAL CENTER

500 University Drive, Hershey, PA 17033

Area Code 717 534-8521

### McKEESPORT CAMPUS

University Drive, McKeesport, PA 15132

Area Code 412 678-9501

Area Code 412 462-6401

### MONT ALTO CAMPUS

Mont Alto, PA 17237

(Waynesboro) Area Code 717 749-3111

### NEW KENSINGTON CAMPUS

3550 7th Street Road, New Kensington, PA 15068

Area Code 412 339-7561

### OGONTZ CAMPUS

1600 Woodland Road, Abington, PA 19001

Area Code 215 886-9400

### \*\*RADNOR CENTER FOR GRADUATE STUDIES AND CONTINUING EDUCATION

259 Radnor-Chester Road, Radnor, PA 19087

Area Code 215 293-9860

### SCHUYLKILL CAMPUS

State Highway, Schuylkill Haven, PA 17972

Area Code 717 385-4500

### SHENANGO VALLEY CAMPUS

Shenango and Reno Streets, Sharon, PA 16146

Area Code 412 981-1640

### WILKES-BARRE CAMPUS

P.O. Box 1830, Wilkes-Barre, PA 18708

Area Code 717 675-2171

### WORTHINGTON SCRANTON CAMPUS

120 Ridge View Drive, Dunmore, PA 18512

Area Code 717 961-4757

### YORK CAMPUS

1031 Edgecomb Avenue, York, PA 17403

Area Code 717 771-4586

\*Upper-division and graduate courses

\*\*Graduate courses

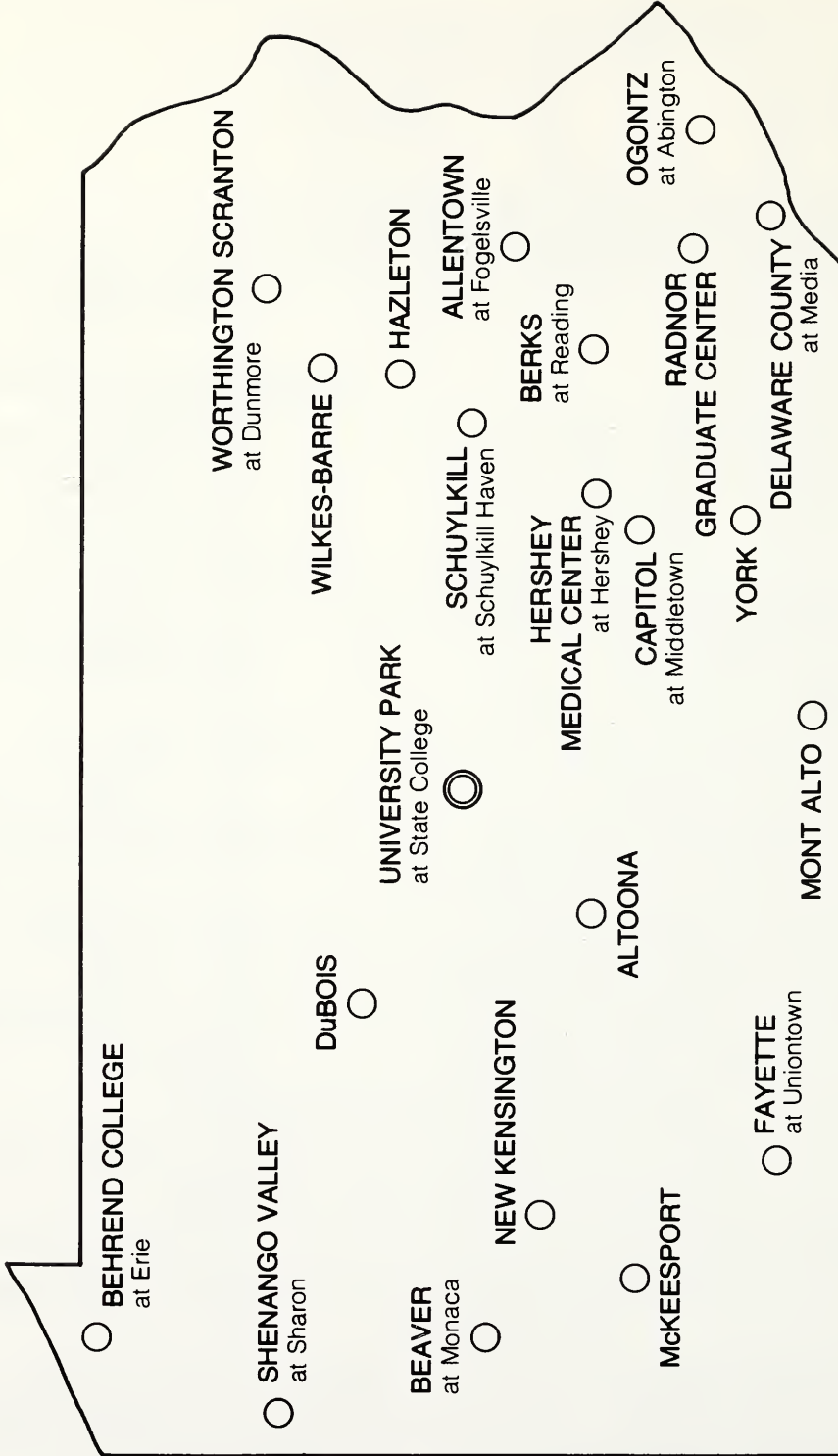
LOCATIONS																			ASSOCIATE DEGREE MAJORS	
	ALTOONA	BEAVER	BEHREND COLLEGE	BERKS	DELAWARE COUNTY	DuBOIS	FAYETTE	HAZLETON	HERSHEY MEDICAL CENTER	McKEESPORT	MONT ALTO	NEW KENSINGTON	OGONTZ	SCHUYLKILL	SHENANGO VALLEY	UNIVERSITY PARK	WILKES-BARRE	WORTHINGTON SCRANTON	YORK	
•	•	•	•	•	•	•	•	•		•	•	•	•	•	•		•	•	• Agricultural Business (1)	
•	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•	• Air Pollution Control Engr. Technology (2)	
							•								•			•	Architectural Engineering Technology	
•	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•	• Biomedical Equipment Technology (3)	
		•	•	•	•	•	•	•		•	•	•		•	•			•	Business Administration	
•	•	•	•	•	•	•	•	•		•	•	•	•	•	•		•	•	• Chemical Engineering Technology (2)	
									•										Clinical Health Services	
				•	•		•												Community Services* (Administration of Justice)	
•	•									•		•		•				•	• Computer Science	
•	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•	• Electrical Engineering Technology	
											•								Forest Technology	
																	•		Highway Engineering Technology	
				•															Hotel and Food Service	
				•	•													•	Labor Studies*	
•	•	•	•	•	•	•	•	•		•	•	•		•	•	•	•	•	• Letters, Arts, and Sciences*	
																	•		Mass Communications — Broadcasting	
					•														Mass Communications — Journalism	
•	•	•	•			•	•	•		•		•	•		•		•	•	• Mechanical Engineering Technology (Drafting and Design Technology)	
								•				•							Medical Laboratory Technology (5)	
															•				Metallurgical Engineering Technology	
•						•	•	•				•		•			•	•	Mining Technology (6)	
•	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•	• Nuclear Engineering Technology (7)	
											•						•		Railway Engineering Technology (4)	
												•	•						Recreation and Parks	
•																			Retailing	
	•					•				•		•			•				Science	
												•							Science — Radiologic Technologist Radiographer option	
						•		•						•		•			Sociology*	
							•								•			•	Solar Heating and Cooling Technology (8)	
											•						•		Surveying Technology	
•	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•	• Telecommunications Technology (4)	
						•													Wildlife Technology	

- (1) Second year offered only at University Park
- (2) Second year offered only at Berks
- (3) Second year offered only at New Kensington and Wilkes-Barre
- (4) Second year offered only at Wilkes-Barre
- (5) Begins summer term at Hazleton and begins fall term at New Kensington
- (6) Second year offered only at Altoona, Fayette, and New Kensington
- (7) Second year offered only at Altoona and Hazleton
- (8) Second year offered only at Fayette

\*Community Services (Administration of Justice), Labor Studies, and Sociology are offered as *extended degree* programs for students wishing to pursue part-time (day or evening) study. Letters, Arts, and Sciences also may be taken as an extended degree program at all University locations. Interested students should write to the Admissions Office or the nearest two-year campus to request a special application form for extended degree programs.



# PENN STATE'S CAMPUS SYSTEM



# THE UNIVERSITY

## MISSION OF THE UNIVERSITY

Penn State's fundamental responsibility is to provide programs of instruction, research, and public service, and thus act as an instrument of self-renewal and development for the Commonwealth. As Pennsylvania's land-grant university, Penn State must preserve and enhance its distinctive qualities.

While the modern university maintains links to the past and serves to maintain cultural values, its most extensive task at present is to help people to understand the great changes taking place in our society. People must have the skills and the learning habits that will make it possible for them to educate themselves over a lifetime. The rapid rate of change in contemporary society dictates that the University's programs adjust without undue delay to meet the needs of students and society.

University programs of research and other creative and scholarly activities are essential if the University is to contribute to the solution of the social, scientific, and technical problems of society and discharge effectively its upper-division and graduate teaching responsibilities. The University must also serve the Commonwealth directly through its programs of extension, continuing education, and other public service programs designed to meet the needs of citizens throughout the state.

By encouraging the enrollment of students from all segments of society and from other states and nations, the University provides the intellectual arena in which the search for rational solutions to societal problems can be nurtured, and in which teaching and learning can be the pivotal function. In performing this function, it is essential that the University foster independent thought and open discussion of alternatives.

## RESIDENT EDUCATION

The undergraduate degree programs of the University provide students with opportunities to increase their knowledge and understanding of the world, and to grow in their individual skills and capabilities for learning, analyzing, judging, creating, and communicating. All undergraduate degree programs and courses offered by the colleges of the University are under the academic sponsorship of a faculty committed to scholarship and are implemented under the academic policies and student rules established by the University Faculty Senate. They are intended to be flexible in accommodating students interested in learning, whether through traditional or non-traditional offerings, while enrolled on either a part-time or a full-time basis. The degree programs and courses of the colleges are offered through University administrative arrangements identified as Resident Education and Continuing Education.

The primary mission of Resident Education is to provide credit courses to degree candidates on University campuses as well as to administer certain off-campus credit-granting activities such as internships, practicums, field trips, and foreign studies. Students not formally admitted to degree candidacy (including provisional and nondegree students) may participate in Resident Education offerings as time and space permit.

## HISTORY

THE PENNSYLVANIA STATE UNIVERSITY, chartered by the Pennsylvania legislature as the Farmers' High School in 1855, was founded by professional men, educated farmers, and state and county agricultural leaders. A faculty of 4 met the incoming class of 69 students in February 1859.

In May 1862 the institution was renamed the Agriculture College of Pennsylvania, a name which recognized that its work was of collegiate level. Two months later, on July 2, President Abraham Lincoln signed the Morrill Land Grant Act offering each state free public land which it could sell to endow institutions of higher learning where "the leading object shall be, . . . to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to

## GENERAL INFORMATION

promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.”

On April 1, 1863, the state legislature declared that the Morrill Act “is hereby accepted by the State of Pennsylvania with all its provisions and conditions and the faith of the State is hereby pledged to carry the same into effect.” The legislature then designated Penn State as the land-grant college of the Commonwealth.

The College broadened the scope of its instruction, began to admit women students, increase its enrollment, and enlarge its physical plant. Graduate work was offered as early as 1862. In 1874 the College was renamed the Pennsylvania State College.

In 1953 the name was changed again—to The Pennsylvania State University—in formal recognition of what Penn State had long since become, one of the country’s leading universities. Its ten undergraduate colleges now offer 122 baccalaureate and 29 associate degree majors. In addition, Behrend College, in Erie, offers 15 complete baccalaureate programs. The Capitol Campus, near Harrisburg, offers 10 baccalaureate degree majors. Graduate students may choose from 125 approved fields of study. The College of Medicine, at The Milton S. Hershey Medical Center in Hershey, offers the M.D. degree, the M.S. and Ph.D. in anatomy, biological chemistry, genetics, microbiology, pharmacology, and physiology, the M.S. degree in laboratory animal medicine, and the associate degree in Clinical Health Services.

The original student body of 69 has grown to 62,571, the faculty of 4 to 3,460. Beginning with an educational program which offered 40 courses, Penn State today offers 4,928 undergraduate and 2,157 graduate courses. The University, whose prime purpose has always been to serve the people and the interests of the Commonwealth and the nation, is accredited by the Middle States Association and is a member of the Association of American Universities.

## ACADEMIC ORGANIZATION OF THE UNIVERSITY

### THE COLLEGES

The University has ten colleges that offer undergraduate majors leading to baccalaureate and associate degrees: College of Agriculture, College of Arts and Architecture, College of Business Administration, College of Earth and Mineral Sciences, College of Education, College of Engineering, College of Health, Physical Education, and Recreation, College of Human Development, College of the Liberal Arts, and College of Science. In addition, Capitol Campus at Middletown and Behrend College at Erie provide an alternative educational setting in which students may enroll in selected degree programs.

### THE UNIVERSITY SYSTEM OF COMMONWEALTH CAMPUSES

In addition to the University Park Campus in the municipality of State College, Behrend College in Erie, and Capitol Campus in Middletown, full-time instruction is available at seventeen Commonwealth Campuses: Allentown, Altoona, Beaver (Monaca), Berks (Reading), Delaware County (Media), DuBois, Fayette (Uniontown), Hazleton, McKeesport, Mont Alto, New Kensington, Ogontz (Abington), Schuylkill (Schuylkill Haven), Worthington Scranton (Dunmore), Shenango Valley (Sharon), Wilkes-Barre, and York.



## TWO-YEAR ASSOCIATE DEGREE MAJORS

The two-year associate degree majors provide concentrated instruction to prepare graduates for specialized assignments in business and industry or to give students a basic two-year education. These majors are offered at Commonwealth Campus locations and Behrend College as listed on page 7 of this bulletin. The Commonwealth Campuses also offer up to two years of work in most of the four-year baccalaureate degree majors offered by the University.

Thirty associate programs lead to either the Associate in Arts degree, the Associate in Engineering degree, or the Associate in Science degree. The majors leading to these degrees are listed below.

### *Associate in Arts Degree*

Labor Studies  
Letters, Arts, and Sciences  
Mass Communications—Broadcasting  
Mass Communications—Journalism  
Sociology

### *Associate in Engineering Degree*

Air Pollution Control Engineering Technology  
Architectural Engineering Technology  
Biomedical Equipment Technology  
Chemical Engineering Technology  
Electrical Engineering Technology  
Highway Engineering Technology  
Mechanical Engineering Technology  
Metallurgical Engineering Technology  
Mining Technology  
Nuclear Engineering Technology  
Railway Engineering Technology  
Solar Heating and Cooling Technology  
Surveying Technology  
Telecommunications Technology

### *Associate in Science Degree*

Agricultural Business  
Business Administration  
Clinical Health Services  
Community Services  
Computer Science  
Forest Technology  
Hotel and Food Service  
Medical Laboratory Technology  
Recreation and Parks  
Retailing  
Science  
Wildlife Technology

A description of the purposes, objectives, and content of each of the two-year majors is given on succeeding pages.

Most of Penn State's associate degree enrollment at present is concentrated in its engineering technology majors. The engineering technology graduate, a specialist in applied rather than theoretical engineering, is equipped to translate creative ideas into new machines, products, structures, and processes. He or she understands the basic scientific principles which are the tools of the graduate engineer and is acquainted with the production tools and materials of this skilled worker.

**STATEMENT OF BASIC ACADEMIC ADMISSIONS POLICIES**—Admission to the University credit courses or degree candidacy at The Pennsylvania State University is governed by policies established by the University Faculty Senate. Although specific applications of these policies may vary from year to year, from location to location, and from program to program, all University admissions are governed by the following general policies:

1. As an institution of higher education, The Pennsylvania State University is committed to making post-high school education available to all who possess a high school diploma or its equivalent without restriction as to race, sex, religion, color, ancestry, national origin, ethnic origin, or handicap or age as provided by law.
2. The primary responsibility of the University is to residents of the Commonwealth of Pennsylvania. Consequently, within limits expressed from time to time by the Board of Trustees



## GENERAL INFORMATION

of the University, preference shall be given to Pennsylvania residents in the various admission processes.

3. In order to meet the variety of goals and objectives of the population, the spectrum of offerings is designed to enable persons with a variety of objectives — both degree and nondegree — to receive higher education. Although access to educational opportunities of the University is open to all, courses offered for credit are available to those holding a high school diploma or its equivalent. Policies governing admission to degree candidacy are established by the University Faculty Senate (with delegation of policies governing admissions to graduate programs to the Graduate Faculty of the University) under a general policy of offering admissions to those whose past academic performance indicates a reasonable probability of success.
4. Undergraduate students are admitted to either baccalaureate degree candidacy or associate degree candidacy. To be admitted to degree candidacy, the individual must present an academic performance record which indicates a reasonable probability of his or her success in his or her chosen program. In the case of freshman admission to undergraduate degree candidacy, performance is measured through the high school record and standardized test results. In the case of advanced standing admission, performance is measured either through success in nondegree programs and courses of the University or by success at some other institution of higher education.
5. Within the space available in particular programs and at particular locations, admissions shall be offered preferentially to those whose performance record indicates the highest probability of success in the chosen program—with this process continuing until all available spaces are filled. Although exceptions to this policy may be made from time to time (for example, recipients of scholarships with restricting qualifications), these exceptions may be made only for students who meet at least the minimum admission and entrance requirements.
6. If a college requires restrictions on its baccalaureate admissions, the priorities or quotas established must include provisions to consider qualified students in each of these groups:
  - Admissions Group I—Freshman Admissions: Students who hold a high school diploma or equivalent, who present fewer than 18 credits of baccalaureate work (from The Pennsylvania State University or another accredited institution), who meet minimum college entrance requirements, and who meet minimum college admission standards are considered in this group.
  - Admissions Group II—Penn State Advanced Standing Admissions: Students who (1) request baccalaureate degree readmission, presenting 18 or more credits; (2) request a change from The Pennsylvania State University associate degree to baccalaureate degree status, presenting 18 or more applicable credits (including Type II, The Pennsylvania State University associate degree graduates); or (3) request a change from The Pennsylvania State University provisional degree to baccalaureate status, presenting 18 or more applicable credits are considered in this group. In all Penn State advanced standing admissions, it is understood that the student must have a G.P.A. of at least 2.00 and meet the minimum entrance and advanced standing requirements of the college.
  - Admissions Group III—Other Advanced Standing Admissions: Students who (1) request changes from The Pennsylvania State University nondegree to baccalaureate status, presenting 18 or more applicable credits; or (2) have not been students at Penn State and request baccalaureate status at Penn State, presenting 18 or more applicable credits. In all advanced standing admissions it is understood that the student must have a G.P.A. of 2.00 and meet the minimum entrance and advanced standing requirements of the college.

Within these three groups, no special consideration will be given to any group; students will be admitted to the college on the basis of academic competition (e.g., SAT scores, grade-point averages, grades in required courses in the college, and other evidence predictive of baccalaureate degree performance where available, valid, and reliable).
7. To assure a proper educational mix of students and to further broaden the educational opportunities offered by the University, the University Faculty Senate and the University

administration may from time to time authorize various specialized programs. These programs may permit students who do not meet the basic qualifications for admission to degree candidacy to be admitted to such candidacy. These programs may also permit, in selected situations, exceptional students who have not earned a high school diploma or its equivalent to enroll in University credit courses. Such specialized programs may include up to 10 percent of the total admission group for the University in any one year and up to a maximum of 15 percent of the admission to any geographic location of the University.

8. Within this general policy, colleges of the University, with the concurrence of the University Faculty Senate, may impose certain educational background requirements (Carnegie Units) which must be completed by an individual before being admitted to degree candidacy.

**ADMISSION REQUIREMENTS—*Freshman Admission***—A person who holds a high school diploma or its equivalent, and who has not taken credit courses at an institution of higher learning, or a person who holds a high school diploma or its equivalent and who has taken less than 18 semester credits at an accredited college or university may be considered for admission as a freshman.

Applicants for admission to all associate degree programs must submit scores of the Scholastic Aptitude Test of the College Entrance Examination Board.

All applications should be addressed to the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802. Telephone: (814) 865-5471.

The University reserves the right to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

An applicant must state in writing whether he or she has attended any other institution of higher learning, even though advanced standing is not desired. Failure to indicate, at the time of registration, previous registration in another institution invalidates the admission.

To be admitted to degree candidacy, the applicant must have completed certain education background requirements, called Carnegie Units or secondary school units. To determine whether you have the appropriate secondary school units required for your choice of a program of study, refer to page 15 to the program of your choice. Then read across to determine the necessary units.

***Basic Skills***—All students entering an associate degree program are tested for basic skills in English composition, reading, and mathematics (arithmetic).

Students identified with major weaknesses in English composition are required to enroll in English 4 (3 credits) prior to scheduling English 10. Students with reading and/or mathematics (arithmetic) weaknesses are encouraged to strengthen these skills through other available University resources.

Students are encouraged through the Basic Skills Program to overcome possible difficulties early in their college careers to ensure greater success with their academic studies.

***Admission with Advanced Standing***—An applicant who has acquired at least 18 semester credits at an accredited college or university and has a cumulative grade-point average of at least 2.00 (on a 4.00 scale) for all graded courses at all colleges and universities previously attended may be considered for admission with advanced standing.

The requirements for admission for such a student are the same as for a beginning freshman student as far as the secondary school record is concerned. In all cases where work has been taken at other institutions, an official transcript from each place of attendance must be submitted directly to the Undergraduate Admissions Office by the institutions attended. The latter must include evidence that the student was honorably dismissed and was in good academic standing at the time of leaving.

An applicant meeting the cumulative grade-point average of at least 2.00 (on a 4.00 scale) but not the entrance requirements may enroll in courses as a provisional student (degree-seeking) or as a nondegree student. An applicant not meeting the minimum requirements of a cumulative grade-point average of 2.00 (on a 4.00 scale) may apply to enroll in credit courses as a nondegree



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student. An applicant enrolling as a provisional or nondegree student must comply with the policy and procedures for students enrolled in these categories.

Associate degree programs have a limit on the number of credits that may be accepted by transfer from accredited institutions. Information on credit limitations may be obtained from the academic official responsible for a particular program. Grades are not transferred with credits from other institutions and do not, therefore, enter the calculation of the term or cumulative average at this University.

*Provisional Student (Degree-Seeking)*—An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admission as a degree candidate may enroll in credit courses at the University. A provisional student must apply to enroll in courses every term. A provisional student may enroll in credit courses if the following criteria are met:

1. The student is making satisfactory progress toward admission as a degree candidate. Progress is satisfactory if a student has earned 18 credits with a minimum grade-point average of 2.00 (on a 4.00 scale). If a student attempted 18 credits and earned less than 2.00, the student is given a warning. A student who has earned 27 credits with a grade-point average of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent term. No student, regardless of cumulative grade-point average, who has completed 36 credits will be permitted to enroll as a provisional student in any subsequent term.
2. There is space available after degree candidates have been accommodated.
3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons may petition for an exception to the policy.

A provisional student may apply to become an associate degree candidate after completing 9 credits of Penn State course work with a minimum grade-point average of 2.00. All these credits must be earned at this university. The applicant must also satisfy the entrance requirements of either the major in which enrollment is desired or of the Division of Undergraduate Studies if the student wishes to enroll in that division. An applicant who has completed at least the equivalent to one year's associate degree work before applying for admission as an associate degree candidate must have the approval of either the dean of the college in which enrollment is desired or of the director of the Division of Undergraduate Studies if the student wishes to enroll in that division. After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a provisional student may be used to fulfill the degree requirements.

*Nondegree Student*—An applicant holding a high school diploma or its equivalent may be permitted to enroll in credit courses (either for credit or audit) at the University. A nondegree student who has not been dropped as a degree or provisional student from the University or any other college or university for poor scholarship may take at least 8 credits per term. A person dropped as a degree candidate from this University or any other college or university for poor scholarship may take courses as a nondegree student to improve a grade-point average in order to apply for reinstatement or admission as a degree candidate at the University. However, a student so dropped may not register as a nondegree student until one term (excluding summer term) has elapsed from the time of the drop action. Such students may register for 6 credits per term (8 credits at Capitol Campus) until degree status is attained.

A nondegree student may apply to enroll in courses each term if the following criteria are met:

1. The applicant has completed the prerequisites for the courses to be taken or can present evidence of ability to follow successfully the courses to be taken.
2. There is space available after degree candidates and provisional students have been accommodated.

## SECONDARY SCHOOL UNITS REQUIRED FOR ADMISSION TO ASSOCIATE DEGREE PROGRAMS

	English	Math. (A)*	Math. (B) +	Math. (C)**	Science	Other Subjects	Total
Agricultural Business	3					12	15
Air Pollution Control Engineering Technology	3	2				10	15
Architectural Engineering Technology	3	2				10	15
Biomedical Equipment Technology	3	2				10	15
Business Administration (2-year)	3		2			10	15
Chemical Engineering Technology	3	2				10	15
Clinical Health Services	3			2	2 + +	8	15
Community Services (Administration of Justice)	3					12	15
Computer Science	3	2				10	15
Electrical Engineering Technology	3	2				10	15
Forest Technology	3		2			10	15
Highway Engineering Technology	3	2				10	15
Hotel and Food Service	3					12	15
Labor Studies	3					12	15
Letters, Arts, and Sciences	3					12	15
Mass Communications-Broadcasting	3					12	15
Mass Communications-Journalism	3					12	15
Mechanical Engineering Technology (Drafting and Design Technology)	3	2				10	15
Medical Laboratory Technology	3	2				10	15
Metallurgical Engineering Technology	3	2				10	15
Mining Technology	3	2				10	15
Nuclear Engineering Technology	3	2				10	15
Railway Engineering Technology	3	2				10	15
Recreation and Parks	3					12	15
Retailing	3					12	15
Science (2-year)	3	2				10	15
Radiologic Technologist Radiographer	3	2				10	15
Sociology (2-year)	3					12	15
Solar Heating and Cooling Technology	3	2				10	15
Surveying Technology	3	2				10	15
Telecommunications Technology	3	2				10	15
Wildlife Technology	3		2			10	15

\*Math. (A) requirements may be satisfied by at least 2 units of mathematics: 1 unit of algebra, and 1 additional unit in any combination of advanced algebra, plane geometry, solid geometry, or trigonometry.

+ Math. (B) requirements may be satisfied by any 2 units of mathematics, but it is strongly recommended that the 2 units be 1 of algebra and 1 of plane geometry.

\*\*Math. (C) requirements may be satisfied by 1 unit of algebra and 1 additional unit in mathematics.

+ + Biology and chemistry are recommended.



## GENERAL INFORMATION

3. The student has not been dismissed or suspended for nonacademic reasons from any college or university. However, a person who has been dismissed or suspended from another college or university for disciplinary reasons may petition for an exception to the policy.

A nondegree student may apply to become an associate degree candidate after completing 9 credits of Penn State course work with a minimum grade-point average of 2.00. All of these credits must be earned at this university. The applicant must also satisfy the entrance requirements of either the major in which enrollment is desired or of the Division of Undergraduate Studies if the student wishes to enroll in that division. An applicant who has completed at least the equivalent to one year's associate degree work before applying for admission as an associate degree candidate must have the approval of either the dean of the college in which enrollment is desired or of the director of the Division of Undergraduate Studies if the student wishes to enroll in that division. After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a nondegree student may be used to fulfill degree requirements.

Note: Provisional students (degree-seeking) and nondegree students are subject to the same tuition charges as regular students. The Academic Policies and Procedures approved by the University Faculty Senate apply to provisional and nondegree students as stated.

An individual desiring to take associate degree courses as a provisional student (degree-seeking) or nondegree student should submit the appropriate application for admission. An application form may be obtained from the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802, or from the office of the director of any Commonwealth Campus of The Pennsylvania State University.

**DIVISION OF UNDERGRADUATE STUDIES**—This division is an academic unit of the University which offers at the Commonwealth Campuses, Behrend College, and University Park the following programs and services:

*Freshman Testing, Counseling, and Advising*—All new freshmen admitted to the University are provided comprehensive testing, counseling, and program planning prior to attending first-term classes. The purpose of the program is to provide all new students with assistance in evaluating their educational plans and objectives.

*Enrollment*—New freshmen who prefer to test their abilities and interests or who wish to explore several areas of study before identifying themselves with one of the University's colleges can request to begin their studies in the Division of Undergraduate Studies. At any time in their academic careers, students whose interests or career objectives change can request that they be enrolled in 2-DUS (Division of Undergraduate Studies). Specialized academic advising in DUS accompanies students' attendance in regular courses until students choose a new program and meet its academic standards for transfer.

*Advising and Counseling*—All students, whether or not they are enrolled in the Division of Undergraduate Studies, have available to them the professional advising, counseling, and referral services provided by the division. Such services are a supplement to and are coordinated with the advisory services of the colleges and faculty. Provisional students aspiring for degree programs are also served by this unit.

*Undergraduate Academic Information*—The Division of Undergraduate Studies provides a comprehensive academic information support system throughout the University to assist faculty in their student advisory responsibilities.

## TWO-YEAR ASSOCIATE DEGREE MAJORS

**GRADING SYSTEM**—Grades shall be reported by the following symbols: A, B, C, D, and F.

<i>Grade</i>	<i>Quality of Performance</i>	<i>Grade-Point Equivalent</i>
A	Excellent	4
B	Good	3
C	Satisfactory	2
D	Poor	1
F	Failure	0

**GRADUATION REQUIREMENTS**—In order to graduate, a student must complete the course requirements of the major and earn at least a C average (a grade-point average of 2.00) for all courses.

**DEGREES**—The associate degree majors outlined in this catalog lead to the following degrees: Associate in Arts, Associate in Engineering, and Associate in Science.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE CAPITOL CAMPUS**—In addition to receiving an education to prepare for employment, the graduate of an associate degree program may also qualify for admission to various programs leading to a baccalaureate degree from Penn State's Capitol Campus. Those anticipating admission to Capitol Campus should inquire at the Capitol Campus Admissions Office late in their freshman year or early in their sophomore year concerning baccalaureate program course requirements.

The following associate programs, with electives in English composition and college algebra, are acceptable toward the baccalaureate degree in Business Administration offered at Capitol Campus: Agricultural Business, Business Administration, Computer Science, Hotel and Food Service, Manufacturing Technology, Medical Laboratory Technology, Retailing, and all of the Engineering Technology majors.

Graduates of the associate programs of Air Pollution Control Engineering Technology, Architectural Engineering Technology, Biomedical Equipment Technology, Chemical Engineering Technology, Electrical Engineering Technology, Highway Engineering Technology, Mechanical Engineering Technology, Solar Heating and Cooling Technology, Surveying Technology, and Telecommunications Technology may wish to consider continuing at the Capitol Campus in a program of study in engineering technology leading to a Bachelor of Technology degree in Building Construction Technology, Electrical Design Engineering Technology, Energy Technology, Mechanical Design Engineering Technology, Transportation Technology, and Water Resources Engineering Technology.

The following associate degrees are also acceptable toward admission to programs leading to a baccalaureate degree at Capitol Campus: Letters, Arts, and Sciences; Mass Communications-Broadcasting; Mass Communications-Journalism; and Sociology.

## STUDENT WELFARE

**ORIENTATION PROGRAM**—At the opening of the fall term all new students participate in an orientation program. In addition to becoming acquainted with the new environment in which they will live and study, students receive instruction and counseling concerning their courses of study, participation in extracurricular activities, and the cultural opportunities open to them. Registration is also held during this period.

**STUDENT GOVERNMENT**—Representative student leadership is provided on each campus of the University by a student government association which functions through officers and representatives elected from and by the student body. In addition to their involvement in student programs at their local campuses, student officers and delegates from University campuses convene several times annually. These meetings provide for an exchange of information among the various student government associations and for system-wide coordination in student government and student activities.

**STUDENT CONDUCT**—The University regards as serious offenses all acts of unethical, immoral, dishonest, or destructive behavior, as well as violations of University regulations as set forth in each campus's student handbook and in the *Policies and Rules for Students*, a copy of which is available to each student upon registration.

**INSURANCE PROTECTION WHILE ATTENDING THE UNIVERSITY**—Any student who desires insurance protection while in attendance at the University (1) for accident and health and/or (2) for loss of property by fire or theft should arrange personally for whatever insurance seems desirable through an agency of his or her choice. Accident and health programs are available under the sponsorship of the Undergraduate or Graduate Student Government Organization.

**STUDENT ACCIDENT / TRIP INSURANCE**—Short-term group trip accident insurance is available to students who are not otherwise covered. Students taking course-connected class trips, or taking group trips with a student organization registered with the Office of Student Activities, may obtain around-the-clock coverage for accidental death and dismemberment, as well as accidental medical expenses. This insurance is available for the duration of the trip. Information about obtaining coverage and paying premiums is available from your instructor, campus business office, or the University risk manager.

**HEALTH SERVICES**—The University Health Service assists in promoting and maintaining the health of students.

Every new full-time student must successfully complete a physical examination before being permitted to register for classes at the University.

The health services of the University are made available to students in accordance with a statement provided by each campus, pertinent to that campus, and published in its student handbook.

The University does not obligate itself for payment of medical services other than those provided by personnel employed or retained by the University and in facilities owned or contracted for by the University. Treatment provided in contract facilities must be authorized by the campus director, dean of student affairs, or nurse.



Students are urged to protect themselves against medical expenses that may result from injury or illness by arranging for personal insurance coverage.

**CAREER DEVELOPMENT AND PLACEMENT**—The Career Development and Placement Center assists students in continual evaluation of their educational and career plans as they progress through college and helps them identify sources of personal or academic difficulty which may interfere with their progress. Individual as well as group educational and career counseling programs are available to students.

A Student Affairs staff member at each campus has responsibility for providing placement assistance for associate degree graduates. Services include bringing employers to the campus to interview graduates for permanent employment, providing job information, and assisting students in preparing for job interviewing. The Career Development and Placement Center at the University Park Campus supplies prospective employers (national, state, and local) with information concerning the associate degree programs and works cooperatively with the Commonwealth Campuses in assisting graduates to locate suitable employment.

## STUDENT AID

In addition to the student aid information provided below, students may wish to consult the *Student Financial Aid* brochure provided in the Application for Admission packet sent to each applicant. After reviewing the brochure, additional questions should be directed to the Office of Student Aid, 335 Boucke Building, on the University Park Campus, or to the Office of Student Affairs at a Commonwealth Campus.

### AID PROGRAMS AVAILABLE TO ASSOCIATE DEGREE CANDIDATES

#### GRANTS (aid sources not requiring repayment)

**Basic Educational Opportunity Grant (BEOG)**—BEOG is the major federal grant program available to undergraduates. This award is available to undergraduates pursuing their first baccalaureate or associate degree on at least a half-time basis (4 credits per term).

**Pennsylvania Higher Education Assistance Agency Grant (PHEAA)**—This is a grant established by the Commonwealth to assist undergraduates who have a financial need as defined by PHEAA guidelines. Applicants must be residents of Pennsylvania.

**NOTE:** Non-Pennsylvania students should contact their state higher education assistance agencies for information on state grants available for attending Penn State.

**Supplemental Educational Opportunity Grant (SEOG)**—This grant is available to students with high documented needs. The yearly maximum SEOG is \$1,500 with an overall maximum of \$4,000 for undergraduate study.

#### LOANS

**Guaranteed Student Loan Program (GSL)**—The GSL is a federally subsidized loan program which offers students attending on at least a half-time basis the opportunity to borrow money for their education. An undergraduate may borrow up to \$2,500 per year with a maximum of \$7,500 for undergraduate studies. The \$25,000 maximum income limit for automatic eligibility for the interest subsidy benefit has been removed. Under the provisions of the Middle Income Student Assistance Act, effective November 1, 1978, the GSL is available on an interest-free basis to all eligible students for the period of enrollment and for the grace period before repayment begins.



## GENERAL INFORMATION

Repayment begins nine months after the termination of the student's education at an interest rate of 7 percent per year simple interest.

*National Direct Student Loan (NDSL)*—This program provides loans of up to \$1,250 per year with an overall maximum of \$5,000 for undergraduates. Repayment starts nine months after termination of the student's education at an interest rate of 3 percent per year simple interest. Postponement of repayment and loan cancellation may be arranged for certain types of employment following graduation.

*University Loans*—University loans are funds established by donors to help students who have a documented financial need. These loans are divided into two categories: short-term and long-term.

1. Short-term loans assist students in meeting unanticipated expenses which relate to the acquisition of a college degree. These loans are interest-free and repayable on a short-term basis — thirty, sixty, or ninety days.
2. Long-term loans help needy students meet the educational and living expenses required to attain a college degree. Repayment starts immediately after the student completes his or her studies at a simple interest rate of 6 percent per year.

## EMPLOYMENT

*College Work Study Program (CWSP)*—The CWSP is a form of federal aid which allows a student to earn a portion of the documented financial need through approved CWSP jobs. This is a nonrepayable source of aid since the student is paid an hourly wage for his or her employment. Earnings from this program when combined with other sources of student aid may not exceed the documented need derived from the Financial Aid Form (FAF).

*Student Employment*—Students who are interested in part-time employment on campus or in the State College area should contact the Student Employment Office, 301A Boucke Building, University Park, PA 16802, or contact the dean of student affairs at Commonwealth Campuses. Earnings from University employment must, according to federal regulations, be considered an aid resource which will be counted toward meeting a student's financial need.

## SCHOLARSHIPS

*University Scholarships*—University scholarships are awarded on the basis of superior high school or college academic performance and, in most cases, documented financial need. They are awarded either by the scholarship committees in the various academic colleges of Penn State, by the Freshman or Faculty Senate Scholarship Committee, or the Commonwealth Campus Scholarship Committees.

## HOW TO APPLY

After completing the application for admission to the University, each student seeking aid consideration should complete the forms necessary for each aid program being sought.

### I. Aid Awarded by the Federal Government

#### BEOG

(All undergraduate students)

Students who have completed the State Grant/Basic Grant application or the Financial Aid Form (FAF) are considered for the BEOG program. After receiving the Student Eligibility Report (SER), which designates eligibility for a BEOG, follow the instructions

contained on the SER to finalize the award. Applications are available from high school guidance counselors, the Office of Student Aid, or the dean of student affairs at Commonwealth Campuses.

## II. Aid Awarded/Coordinated by the States

PHEAA grant (Pennsylvania residents only)

Other state grant/scholarship programs

Guaranteed Student Loan

(Undergraduates)

Pennsylvania residents should complete the combined State Grant/Basic Grant application. Students currently receiving PHEAA grants will receive renewal applications by mail from the PHEAA agency. Regular applications are available from high school guidance counselors, the Office of Student Aid, and the dean of student affairs at Commonwealth Campuses in addition to the Pennsylvania Higher Education Assistance Agency. Non-Pennsylvania students should contact their state's Higher Education Agency for information on aid programs available to them as Penn State students.

(PA and non-PA residents)

Contact a local bank or lending institution for application forms for the Guaranteed Student Loan Program. After completing the forms, submit them to the Office of Student Aid, 335 Boucke Building, University Park, PA 16802, along with a stamped envelope addressed to the lender.

## III. Aid Awarded by The Pennsylvania State University

Supplemental Educational Opportunity Grant (SEOG)

National Direct Student Loan (NDSL)

College Work Study Program (CWSP)

University loans and scholarships

(All students)

Complete the State Grant/Basic Grant application or the Financial Aid Form (FAF). File by February 15.

Note: The State Grant/Basic Grant application or the FAF is the only form necessary for the entering freshman to complete to be considered for the above aid sources. Both forms are available from high school guidance counselors, the Office of Student Aid, and the dean of student affairs at Commonwealth Campuses. The recommended filing date for early consideration is February 15; however, students are encouraged to submit applications at any time during the year.

(All students except entering freshmen)

Complete the Office of Student Aid's Financial Aid Application. Students may indicate on this application the type of aid they are seeking, with the exception of University scholarships. File by April 1. The application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

(All students except entering freshmen)

Complete the University Scholarship Application. Since funds are limited, applications are only encouraged from those students with a cumulative grade-point average of 3.00 or higher. File by April 1. This application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

(Transfer students only)

Complete a Financial Aid Transcript. It is necessary for the University to know if you received aid at any other institution prior to enrolling at Penn State. Request this form from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

## GENERAL INFORMATION

### IV. Private Aid Sources

All students are urged to explore local scholarship/grant opportunities as well as any private low-interest loan funds offered by local employers and civic organizations.

### HOW MUCH DOES IT COST TO ATTEND PENN STATE?

One of the major concerns of students and their parents is knowing how much it will cost to attend Penn State for an academic year. The following itemized listing of expenses, although prepared for the 1980-81 academic year, may be used as a basic guide for your planning. Students may find that some of the costs vary according to individual needs and circumstances.

#### STUDENT BUDGET — 1980-81

	<i>Residence Halls or Off-Campus Housing (All Campuses)</i>	<i>Living at Home</i>
Commonwealth Campus Tuition (including Behrend College)	\$1,416*	\$1,416*
Room & Board	1,830	1,205
Books & Supplies	240	240
Clothing & Laundry, Transportation, Personal Maintenance, Medical, & Recreation	1,473	1,774
Total*	<u>\$4,959</u>	<u>\$4,635</u>

\*For non-Pennsylvania residents the nonresident undergraduate tuition figure of \$3,297 should be substituted. The total estimated budget for an out-of-state undergraduate student at University Park Campus or a Commonwealth Campus is \$6,840.

The 1980-81 tuition at University Park is \$1,641.

### STUDENT RIGHTS AND RESPONSIBILITIES

The Office of Student Aid at Penn State administers and coordinates the aid programs according to applicable federal and state regulations and University policies which guarantee each student equal access to financial assistance. The Office of Student Aid employs the standard need analysis services of the College Scholarship Service and the Pennsylvania Higher Education Assistance Agency to assess the aid eligibility of student applicants, ensuring equity of treatment among all applicants. The University does not discriminate on the basis of race, creed, color, national origin, handicap, age, or sex in any of its policies, practices, or procedures.

Eligibility for aid is contingent upon the student's financial need for assistance to meet educational costs. Each program has specific eligibility requirements which must be met before funds are awarded. In addition to financial need as a criterion for receiving aid, a student must be enrolling as a degree or provisional student. Nondegree students are not eligible to receive aid at Penn State. The University may require an official copy of the Federal Income Tax Form 1040 to verify eligibility for aid.

Satisfactory academic progress must be maintained for continued consideration for assistance. Although satisfactory progress is generally measured by institutional standards, certain aid programs have additional expectations which must be met for continued support. The student is encouraged to read carefully all aid application materials for further information about maintaining eligibility.

The Office of Student Aid assumes that all aid applicants will keep apprised of all application deadlines pertaining to the aid sources they are seeking. Because limited funds are available,



## TUITION, ROOM, BOARD, AND OTHER CHARGES

applications filed after the applicable deadline dates are considered only as funds permit. On-time applicants receive first consideration. Some aid programs have flexible application deadlines which permit students to receive consideration at most times during the year (for example, the GSL and BEOG programs). Current and prospective aid recipients are strongly encouraged to keep well informed of aid application procedures through aid publications, news media, and agencies providing aid information such as the Office of Student Aid at University Park and the Office of Student Affairs at Commonwealth Campuses.

Aid is never automatically awarded for subsequent years. Students must reapply each year for funds. Students who plan to attend the summer term must file separate applications to be considered for almost all aid programs. The major exceptions to this requirement are as follows:

1. Entering freshmen seeking aid awarded by the University (see “How to Apply” above) must file only the State Grant/Basic Grant application or the FAF to receive consideration for the summer term if they have been admitted to the University specifically to begin during the summer term; and
2. The BEOG program has no separate summer application and is generally awarded to students during the fall-winter-spring academic year. (BEOG recipients not attending the entire fall-winter-spring year should contact the Office of Student Aid to determine if a summer payment is possible.)

One of the goals of the Office of Student Aid is to help financial aid recipients receive a financial aid package which will meet the student’s documented financial need. The financial aid package can be composed of federal aid, state grant monies, private award sources, or any other source of funds available to the student, including earnings from University employment.

It is the responsibility of the Office of Student Aid, however, to assure the federal government that federal aid recipients will not be permitted to retain financial aid *exceeding* the students’ need. Students should be aware that if the aid received is in excess of need, they will be notified of their responsibility to return the excess amount to the University.

## TUITION, ROOM, BOARD, AND OTHER CHARGES

*NOTE: The University reserves the right to revise tuition, room, board, and other charges without further notice. Tuition and charges for baccalaureate and graduate programs are listed separately in the Baccalaureate Degree Programs, Graduate Degree Programs, and Capitol Campus catalogs. Penn State has four ten-week terms each year. Students normally attend three terms per year.*

**TUITION**—Tuition per term for associate degree students:

	<i>Pennsylvanians</i>	<i>Non-Pennsylvanians</i>
8 or more credits:		
University Park Campus	\$547	\$1,099
Other Commonwealth Campuses	472	1,099
7 or fewer credits:		
University Park Campus—rate per credit	69	139
Other Commonwealth Campuses— rate per credit	52	139

**Enrollment Charge**—All entering students who plan to enroll for 8 or more credits are required to pay a nonrefundable enrollment charge of \$52 upon acceptance of an offer of admission.

**General Deposit**—All full-time undergraduate students are required to make a general deposit of \$50 at the time of admission. This deposit will serve to safeguard the property and equipment used by students in their course of study. It will be retained until a student withdraws or is graduated.

The deposit, less any charges for equipment damages, losses, and forfeitures, will be refunded early in the subsequent term to the student who has withdrawn or been graduated. The refund



## GENERAL INFORMATION

will be made by check and mailed to the student's home address. If at any time the balance of the deposit falls below the minimum amount of \$15, the deposit must be replenished.

*Credit by Examination*—A charge of \$15 per credit is made for credit by examination. For evaluation of credits completed elsewhere a charge of \$20 is made for those applying for admission and a charge of \$3 for those who are already matriculated.

*Student Activities*—Student activities charges are determined by elected representatives of the student body, together with a faculty representative.

*Change of Schedule Charge*—Unless a change is necessitated by the University, a charge of \$6 is made for each change of schedule after the first five working days of a term.

*Late Registration Charge*—Unless the delay is unavoidable, \$10 is charged a student who fails to register on the appointed day.

*Other Expenses*—Books and supplies must be secured by the student. These vary from approximately \$75 per term, depending upon the program.

**TERMS OF PAYMENT**—Tuition and charges, including room and board, are due and payable in advance of each term at the Office of the Bursar, 103 Shields Building, University Park, PA 16802. Registration for courses may not be completed until tuition and charges are paid.

Approximately six weeks in advance of each term, the University will mail to each continuing and newly admitted student of record an estimated bill for tuition and, where applicable, residence hall charges. Payment by mail is encouraged before the established deadline. The receipt is returned to the student by mail and will permit registration for the designated number of credits. This receipt is likewise authorization to obtain, where applicable, the residence hall key and meal ticket. If checks tendered for payment of tuition and charges are not paid upon presentation to the maker's bank, the student will automatically incur the late payment fee of \$25, and the receipt previously mailed will be considered null and void.

Any student who does not fulfill payment of obligations by the deadline established may be charged the late payment fee of \$25. This charge for late payment also applies to unpaid student supplemental charges. Students whose accounts are delinquent for more than ten days are subject to suspension from the University.

**WITHDRAWALS AND REFUNDS**—In the event of withdrawal, charges for tuition will be refunded under the following policy:

Refund of 80 percent upon withdrawal before the end of the first week of the term (seventh consecutive calendar day from the first day of classes) and a decrease of 20 percent for each week thereafter up to and including the fourth consecutive calendar week. No amount will be refunded for withdrawal after the fourth consecutive calendar week of the term.

Students whose reduction in credits results in fewer than 8 credits will receive refunds of tuition for credits dropped on the basis of these policies.

Any refund policy related to adjustments in room and board will be a part of the housing contract.

# MAJORS

## GENERAL DEGREE REQUIREMENTS

There are a number of areas in which a certain level of competence is expected of all recipients of associate degrees. Therefore, all associate degree programs of the University demand the satisfactory completion of the following requirements:

- 3 credits in the social sciences
- 3 credits in the arts and humanities
- 3 credits in English
- 3 credits in speech communication
- 6 credits in the physical sciences, biological science, or mathematics
- 3 credits in general education electives\*

**RESERVATIONS**—The University reserves the right to make such program or class changes as may become necessary because of insufficient enrollment or other contingencies. The University also reserves the right to make any necessary changes in tuition and charges without prior notice. Courses and programs described and listed in this catalog are also subject to change without notice.

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\*If the student has not had courses in all three areas of physical science, biological science, and mathematics either in high school or in his or her associate degree program, these three “general education” credits must be used to remedy this deficiency. Otherwise, they may be in any of the areas listed above.

AGRICULTURAL BUSINESS

This major prepares students for service in commercial farming and businesses which serve agriculture. The latter includes businesses which process and market farm products, as well as those which provide farmers with all kinds of production supplies, such as feeds, fertilizers, chemicals, biological products, and machinery. Training is also provided in agricultural business organization, management, and sales. This basic program is supported with courses in crop and livestock production and in agricultural engineering.

To be eligible to receive the associate degree, a student must have completed the prescribed major of 62 credits. The first three terms are offered at selected Commonwealth Campuses. The last three terms are offered at the University Park Campus.

FIRST TERM		SECOND TERM	
Acctg. 801, Introductory Accounting; or Acctg. 101, Introductory Financial Accounting	3	Biological science selection	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	B.Law 843, Introduction to Business Law; or B.Law 243, Legal Environment of Business	3
Social science selection	3	Engl. 20, Composition and Rhetoric II; or selection	3
	—	Sp.Com. 200, Effective Speech	3
	9		—
			12
THIRD TERM		FOURTH TERM	
Chem. 11, Introductory Chemistry	3	Ag.E. 800, Farm Power	2
Humanities selection	3	Ag.E. 801, Farm Structures and Utilities	3
Elective	3	Ag.Ec. 803, Introduction to Agricultural Business	3
	—	Elective	3
	+ 9		—
			11
FIFTH TERM		SIXTH TERM	
Ag.Ec. 2, Marketing	3	Ag.Ec. 6, Farm Management	3
A.I. 800, Livestock Production	2	Ag.Ec. 800, The Agricultural Economy	3
Pty.Sc. 801, Poultry Production	2	Plt.Sc. 801, Production of Horticultural Crops	3
D.Sc. 802, Dairy Production	2	Plt.Sc. 802, Use of Agricultural Chemicals	3
Agro. 800, Field and Forage Crop Production	3		—
	—		12
	+ 12		

\*Students will be placed in Engl. 4 or 10 on the basis of English Placement Test scores.  
+ A student may schedule up to 12 credits in these terms. If additional credits are scheduled, suggested courses are mathematics, economics, business management, or biological science.

## AIR POLLUTION CONTROL ENGINEERING TECHNOLOGY

This major prepares students for positions as air pollution control technicians, working for a local, state, or federal agency. Technicians may be responsible for the calibration, installation, and operation of air sampling and monitoring equipment, investigation of complaints, plant inspections, and source evaluation. As an industrial air pollution control technician, these same responsibilities may be required with the addition of evaluation and monitoring of gas cleaning equipment and performance.

To graduate, 71-72 credits are required.

FIRST TERM		<i>Credits</i>	SECOND TERM		<i>Credits</i>
Chem. 11, Introductory Chemistry		3	Chem. 12, Chemical Principles		3
E.G. 1, Engineering Drawing		2	Chem. 14, Experimental Chemistry		1
*Engl. 4, Basic Writing Skills; or			Cmp.Sc. 1, Basic Computer		
Engl. 10, Composition and			Programming		1
Rhetoric I		3	*Engl. 10, Composition and		
Engr. 2, Engineering Orientation		1	Rhetoric I; or Engl. 20,		
Math. 801, Technical Mathematics		3	Composition and Rhetoric II; or		
		—	Engl. 826, Report Writing		3
		12	Math. 802, Technical Mathematics		3
					—
					11
THIRD TERM		<i>Credits</i>	+ FOURTH TERM		<i>Credits</i>
Chem. 13, Chemical Principles		3	Chem. 23, Introduction to Modern		
Chem. 15, Experimental Chemistry		1	Analytical Chemistry		4
Math. 803, Technical Calculus		3	E.E. 801, Fundamentals of D.C.		
Sp.Com. 200, Effective Speech		3	Circuits		3
Social science selection		3	E.Mch. 810, Basic Mechanics, or		
		—	E.Mch. 811, Elementary		
		13	Mechanics		2-3
			Phys. 150, Technical Physics		3
					—
					12-13
FIFTH TERM		<i>Credits</i>	SIXTH TERM		<i>Credits</i>
Ch.E. 802, Chemical Technology		3	E.E. 814, Electrical Circuits		4
Ch.E. 830, Industrial Chemistry		3	E.E. 818, Electrical Circuits		
E.E. 809, D.C. Circuits Laboratory		2	Laboratory		1
Humanities selection		3	M.E. 882, Air Resource		
		—	Management		2
		11	M.E. 884, Sampling and		
			Monitoring Program		2
			Meteo. 303, Introductory		
			Meteorology		3
					—
					12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

+ Second year to be taken at Berks Campus.



ARCHITECTURAL ENGINEERING TECHNOLOGY

This two-year program is designed to provide technically trained personnel between the level of high school graduate and professional architectural engineer or architect to support the architectural design and construction industries. Architectural engineering technicians work under the supervision of a graduate architect or architectural engineer. They translate sketches and design concepts into working drawings and renderings. To do so, they need basic skills in structural and environmental systems design and layout, knowledge of building materials and equipment characteristics and performance, as well as the training in drafting techniques required for the realization of final drawings.

The graduates of this major are prepared for employment in architectural, building engineering, or industrialized housing firms. To graduate, 71-72 credits are required.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
A.E. 801, Building Materials	3	A.E. 802, Methods of Construction	3
E.G. 3, Architectural Graphics	2	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Math. 802, Technical Mathematics	3
Engr. 2, Engineering Orientation	1	Phys. 150, Technical Physics	3
Math. 801, Technical Mathematics	3		—
	—		12
	12		

THIRD TERM		FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
A.E. 803, Plumbing and Fire Protection	3	A.E. 804, Heating, Ventilating, and Air Conditioning Layout	3
E.Mch. 811, Elementary Mechanics	3	A.E. 814, Steel Construction	3
Math. 803, Technical Calculus	3	Cmp.Sc. 101, Introduction to Algorithmic Processes	3
Phys. 151, Technical Physics	3	Social science selection	3
	—		—
	12		12

FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
A.E. 812, Building Lighting and Electrical Layout	3	A.E. 807, Advanced Construction Methods	3
A.E. 815, Concrete Construction	3	A.E. 810, Architectural Engineering Office Practice	3
Sp.Com. 200, Effective Speech	3	Humanities selection	3
Technical selection	2-3	Technical selection	3
	—		—
	11-12		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## BIOMEDICAL EQUIPMENT TECHNOLOGY

This major prepares students for careers as biomedical equipment technicians, men and women responsible for specifying, calibrating, maintaining, and replacing clinical electronic equipment used in patient care. Modern health care facilities now have complex electronic instrumentation and apparatus located in virtually every diagnostic and patient treatment area. While these innovations result in improved patient care, they also require extensive maintenance procedures, new equipment calibration, complex servicing and repair, as well as attention to patient and operator safety. To graduate, 75 credits are required.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 5, Experimental Methods for Engineers; or if not available, Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		—
	12		11
THIRD TERM		FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
Cmp.Sc. 1, Basic Computer Programming	1	Biol. 41, Physiology	3
E.E. 814, Electrical Circuits	4	Chem. 11, Introductory Chemistry	3
E.E. 818, Electrical Circuits Laboratory	1	E.E. 807, A.C. and Electronics Laboratory	2
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3	E.E. 810, Fundamentals of Semiconductors	3
Math. 803, Technical Calculus	3		—
	12		11
FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
B.E.T. 801, Physiological Transducers	3	B.E.T. 802, Biomedical Instrumentation and Systems	3
E.E. 816, Linear Electronic Circuits	3	B.E.T. 804, Medical and Clinical Equipment	3
E.E. 821, Linear Electronics Laboratory	1	Humanities selection	3
Sp.Com. 200, Effective Speech	3	Technical selection	3
Social science selection	3		—
	13		12
SEVENTH TERM (SUMMER)			
	<i>Credits</i>		
B.E.T. 803, Biomedical Equipment Laboratory (Internship)	4		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

# BUSINESS ADMINISTRATION

This two-year, college-level academic program is designed to provide instruction in business administration that fulfills the requirements of various levels of responsibility higher than that held by high school graduates.

The primary objective of this major is to provide a managerially oriented program with sufficient communicative and mathematical skills, socially relevant course work, and advanced courses in specific business specialties to develop a well-rounded graduate. To graduate, 68 credits are required.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	12
*Engl. 4, 10, 826; Sp.Com. 200	
B. Social sciences, humanities	9
History, humanities, political science, psychology, sociology selection	
C. Physical education	2
II. Requirements for the Major (45 credits)	
A. General	30
Econ. 2 or 4; Computer Science; Math. 800 or 17; Acctg. 801, 802;	
B.Law 843; Fin. 807; Mgmt. 800; Mktg. 800; Q.B.A. 101 or 801	
B. Specialization	15
Students will select five courses from the following list according to	
their area of specialization: Acctg. 803, 806, 807; B.A. 250, 803;	
B.Law 850; B.Log. 102, 104, 206; Cmp.Sc. 102, 140, 890; Fin. 108,	
210; Ins. 800, 810, 820, 830; I.B. 862; Mktg. 801, 802, 803, 804, 805,	
806, 807, 809; Mgmt. 801, 802; Q.B.A. 102; R.Est. 800, 810, 830	

\*Students will be placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students not required to take Engl. 4 will take Engl. 20.

## CHEMICAL ENGINEERING TECHNOLOGY

This major prepares graduates for positions as assistants to chemists and chemical engineers, assistants in research and control laboratories, and trainees for future supervisory positions in manufacturing and production.

It provides the training necessary for such positions, including a reasonable proficiency in basic sciences, mathematics, communication skills, and the basic principles of chemical engineering technology.

To graduate, 71-72 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3-4
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or		Cmp.Sc. 1, Basic Computer	
Engl. 10, Composition and		Programming	1
Rhetoric I	3	*Engl. 10, Composition and	
Engr. 2, Engineering Orientation	1	Rhetoric I; or Engl. 20,	
Math. 801, Technical Mathematics	3	Composition and Rhetoric II; or	
	—	Engl. 826, Report Writing	3
	12	Math. 802, Technical Mathematics	3
			—
			11-12
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Social science selection	3	Ch.E. 800, Technical Calculations	3
Chem. 13, Chemical Principles	3	Chem. 23, Introduction to Modern	
Chem. 15, Experimental Chemistry	1	Analytical Chemistry	4
Math. 803, Technical Calculus	3	Phys. 150, Technical Physics	3
Sp.Com. 200, Effective Speech	3	Humanities selection	3
	—		—
	13		13
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Ch.E. 802, Chemical Technology	3	Ch.E. 803, Chemical Technology	3
Chem. 34, Organic Chemistry	3	Ch.E. 820, Chemical Technology	
Phys. 151, Technical Physics	3	Laboratory	4
Ch.E. 830, Industrial Chemistry	3	Technical selection	3
	—		—
	12		10

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.



CLINICAL HEALTH SERVICES

CLINICAL HEALTH SERVICES

The objective of this program is to train students to assist the primary care physician in providing health care to patients with a wide variety of problems. The training for the physician's assistant consists of three twelve-week terms in basic and clinical sciences, conducted at the Hershey Medical Center campus, and three twelve-week terms in a primary care setting. Upon completion, the student may take the National Certification Examination for Physician's Assistants.

This program has special admission requirements. For more information write to The Milton S. Hershey Medical Center, 500 University Drive, Hershey, PA 17033.

FIRST TERM	Credits	SECOND TERM	Credits
Engl. 10, Composition and Rhetoric I	3	Sp.Com. 200, Effective Speech	3
P.A. 800, Mechanisms of Body Function I	2	P.A. 801, Mechanisms of Body Function II	2
P.A. 805, Microbiology	2	P.A. 811, Human Behavior II	2
P.A. 810, Human Behavior I	2	P.A. 821, Patient-Oriented Care II	2
P.A. 820, Patient-Oriented Care I	1	P.A. 831, Medical/Surgical Problems II	2
P.A. 830, Medical/Surgical Problems I	2	P.A. 850, Therapeutics	2
P.A. 840, Diagnostics	1	P.A. 807, Human Genetics	1
	—		—
	13		14
THIRD TERM	Credits	FOURTH TERM	Credits
Human. 101, Science and Human Values	3	P.A. 880, Practicum in Primary Health Care Delivery I	10
P.A. 802, Mechanisms of Body Function III	2		—
P.A. 822, Patient-Oriented Care III	2		10
P.A. 832, Medical/Surgical Problems III	2		
P.A. 860, Emergency Medicine	2		
P.A. 879, Pediatrics	2		
	—		
	13		
FIFTH TERM	Credits	SIXTH TERM	Credits
P.A. 881, Practicum in Primary Health Care Delivery II	10	P.A. 882, Practicum in Primary Health Care Delivery III	10
	—		—
	10		10

## COMMUNITY SERVICES

The Community Services major is designed to provide entry-level professional competency in one of several human service fields. The objectives of the Administration of Justice emphasis are to provide a general education background, a knowledge base in human development, and a core of professional skills.

The Administration of Justice emphasis educates and upgrades career personnel in police departments, probation and parole agencies, and correctional institutions. Challenges and problems in law enforcement, current approaches and alternatives for crime control, prevention, and rehabilitation are studied. The program includes one term of field experience in a local community agency. To graduate, 62 credits are required.

### *The Administration of Justice Emphasis*

I. General Education Requirements (21 credits)	<i>Credits</i>
A. Communication skills	
Engl. 10, 20; Sp.Com. 200	9
B. Biological and physical sciences	
A minimum of 3 credits in each area	6
C. Arts and humanities	3
D. Social and behavioral sciences	3
II. Requirements for the Major (41 credits)	
A. General requirements	
Adm.J. (Com.D.) 7, H.Dev. 100, I.F.S. 129	7
B. Requirements for Administration of Justice emphasis	34
H.Dev. 395 (12)*, or Adm.J. 495 (8) plus 4 additional credits of approved professional electives; Adm.J. 111 and 221, plus 16 credits of professional electives with consent of adviser.	

\*Guidelines for Field Placement include:

1. Agencies utilized are local agencies.
2. Priority for placement is made for students with higher term standings.
3. Prerequisites for placement include Adm.J. (Com.D.) 7 and Adm.J. 111.

COMPUTER SCIENCE

The primary objective of this program is to prepare graduates for immediate and continuing employability as application programmers, associate systems designers, or associate systems programmers.

To meet this objective the program is designed to ensure a thorough knowledge of the techniques of programming general-purpose digital computers, and includes extensive practice—using contemporary programming technologies—in the analysis, organization, validation, and documentation of effective computer code. The program also includes practical knowledge of the logical organization of modern digital computers and related peripheral equipment, the structure of operating systems and compilers, and considerations in the design of information systems.

The General Education Requirements provide the student with an extension to the basic educational foundation. The General Requirements for the Major give the graduate technical competence in the computing and data processing field. The Application Specialization provides a practical knowledge of a minor or application field within which the graduate may profitably utilize the acquired computing talent. To graduate, 65 credits are required.

	<i>Scheduling Recommendation by Term Standing</i>	
	1-3	4-6
I. General Education Requirements (29 credits)		
A. Communication skills (9 credits)		
English selections (6)	x	—
Sp.Com. 200 (3)	—	x
B. Mathematics and statistics (12 credits)		
Math. 17 (3), 18 (3)	x	—
Mathematics selection (3)	x	—
Quantitative business analysis or statistics selection (3)	—	x
C. Social science, arts, humanities (6 credits)		
Social science selection (3)	x	x
Arts and humanities selection (3)	x	x
D. Physical education (2 credits)		
Physical education selections	x	—
II. Requirements for the Major (36 credits)		
A. General (24)		
Cmp.Sc. 101, 102, 140 (9)	x	—
Cmp.Sc. 804 (2)	x	—
Cmp.Sc. 144, 154, 164 (10)	—	x
Cmp.Sc. 805 (3)	—	x
B. Application Specialization (12 credits)		
Related course work in an area of computer application—to be approved by the student's adviser. These courses may be chosen from areas such as accounting, retail operations, general business, mathematics, general science, environmental resources, etc., and are selected from the courses offered at the student's campus.	x	x

## ELECTRICAL ENGINEERING TECHNOLOGY

This major is designed to prepare graduates for technological service with electrical utilities, manufacturers of electrical and electronic equipment, and electrical maintenance and instrument departments of various industrial concerns. The principal objective is to provide a practical knowledge of electrical machinery and its control, as well as of electronic theory and its application in communication and control systems.

To graduate, 74-75 credits are required.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		—
	—		11
	12		
THIRD TERM		SUMMER TERM	
	<i>Credits</i>		<i>Credits</i>
Cmp.Sc. 1, Basic Computer Programming	1	E.E. 813, Fundamentals of Electrical Machines	3
E.E. 814, Electrical Circuits	4		
E.E. 818, Electrical Circuits Laboratory	1		
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3		
Math. 803, Technical Calculus	3		
	—		
	12		
FOURTH TERM		FIFTH TERM	
	<i>Credits</i>		<i>Credits</i>
E.E. 804, A.C. Circuits	2	E.E. 815, A.C. Machinery and Control	3
E.E. 807, A.C. and Electronics Laboratory	2	E.E. 817, Advanced Electronics	4
E.E. 810, Fundamentals of Semiconductors	3	E.E. 819, A.C. Machinery Laboratory	1
E.Mch. 810, Basic Mechanics	2	E.E. 820, Advanced Electronics Laboratory	1
Social science selection	3	Sp.Com. 200, Effective Speech	3
	—		—
	12		12
SIXTH TERM			
	<i>Credits</i>		
E.E. 811, Microprocessors	3		
E.E. 816, Linear Electronic Circuits	3		
E.E. 821, Linear Electronics Laboratory	1		
Humanities selection	3		
Technical selection	2-3		
	—		
	12-13		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.



## FOREST TECHNOLOGY

The objectives of this major are to train students in the techniques that are basic to planning, organizing, directing, and managing forestry enterprises and to provide a program of general studies which will serve as a foundation for future intellectual growth. It is intended that graduates will act in a supporting capacity to professional foresters.

To be eligible to receive the degree of Associate in Science, a student must have completed the prescribed major of 69 credits.

FIRST TERM	Credits	SECOND TERM	Credits
*Engl. 10, Composition and Rhetoric I	3	For. 806, Forest Inventories	3
For. 203, Dendrology	2	For. 815, Forest Surveying I	3
For. 804, Forest Mensuration	3	For. 825, Harvesting Techniques	1
For. 824, Introduction to Harvesting	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3		—
	12		10
THIRD TERM	Credits		
For. 240, Silvicultural Practices	3		
For. 816, Forest Surveying II	3		
For. 826, Reforestation and Intermediate Operations	1		
Humanities selection	3		
	10		
FOURTH TERM	Credits	FIFTH TERM	Credits
For. 220, Forest Ecosystem Protection	3	For. 241, Aerial Photo Interpretation	4
+ For. 221, Forest Fire Technology	1	For. 809, Forest Valuation	3
For. 242, Elements of Project Supervision in Forestry	3	Sp.Com. 200, Effective Speech	3
¶For. 807, Forest Recreation	2	Social science selection	3
For. 814, Forestry Leadership Practicum	1		—
	8-10		13
SIXTH TERM	Credits	SUMMER TERM (Sophomores)	Credits
Acctg. 16, Introductory Accounting Survey	3	For. 820, Advanced Forest Measurements	1
Engl. 826, Report Writing	3	For. 821, Field Studies in Ecology	1
+ For. 807, Forest Recreation Practicum	1	For. 822, Forest Management Systems	1
¶For. 810, Forest Improvements	3	For. 827, Field Study Preparation	1
¶For. 817, Urban Forestry	3		—
	10-13		4

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10.

+ Practicums which require the lecture course as a prerequisite.

¶Students must take two out of three of these courses.

## HIGHWAY ENGINEERING TECHNOLOGY

This major prepares highway construction technicians to perform many of the planning and design tasks necessary in the construction of highways, railroads, bridges, viaducts, and airfields. In the planning stages of construction a highway construction technician may be engaged in estimating costs, purchasing materials, preparing specifications, computing fills, cuts, drainage requirements, drafting, designing, or surveying. During actual construction, such technicians may perform supervisory functions and inspection.

To graduate, 73 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	E.Mch. 810, Basic Mechanics	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 150, Technical Physics	3
	<hr/> 12		<hr/> 13
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
C.E. 812, Curves and Earthwork	3	C.E. 814, Photogrammetry	3
Cmp.Sc. 1, Basic Computer Programming	1	C.E. 818, Route Surveying	2
E.Mch. 813, Strength and Properties of Materials	3	*Engl. 826, Report Writing	3
Math. 803, Technical Calculus	3	Geosc. 1, Physical Geology	3
Phys. 151, Technical Physics	3		<hr/> 11
	<hr/> 13		
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
C.E. 821, Concrete Technology	3	C.E. 824, Asphalt Technology	3
C.E. 822, Soil Mechanics	3	C.E. 825, Construction Estimating	3
C.E. 823, Highway Organization and Operations	3	Econ. 14, Principles of Economics	3
Human. 1, Values of the Western Cultural Heritage	3	Sp.Com. 200, Effective Speech	3
	<hr/> 12		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

HOTEL AND FOOD SERVICE

This is an intensive six-term major designed to prepare students for responsible executive positions in the hospitality industry and in health facilities food service administration. The emphasis in Health Facilities Food Service Administration qualifies students as dietetic technicians. The course of study places heavy reliance on experience acquired in an on-the-job setting. To graduate, 68 credits are required.

Students who achieve outstanding records may, upon completing this program, apply for admission to the baccalaureate degree program in Food Service and Housing Administration in the College of Human Development. Nine additional terms of satisfactory work are required to earn the baccalaureate degree.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	
6 credits in English, Sp.Com. 200	9
B. Arts, humanities, social and behavioral sciences	12
At least 3 credits in economics	
C. Physical Education	2
II. Requirements for the Major (45 credits)	
A. General	15
F.S.H.A. 225, 295; H.F.S. 850, 860; 3 credits in accounting	
B. Specialization	30
Students may select an emphasis in Hospitality Administration or Health Facilities Food Service Administration.	
Students emphasizing Hospitality Administration will be required to take F.S.H.A. 102, H.F.S. 804 and 870, plus 20 additional credits with the approval of their adviser. Students emphasizing Health Facilities Food Service Administration will be required to take F.S.H.A. 103, H.F.S. 875, Nutr. 351 and 800, plus 16 additional credits with the approval of their adviser.	

## LABOR STUDIES

The purpose of this program is to help employees improve their understanding and competence in coping with personal, group, and organizational problems at their worksites, in relationships with employers, and in transactions with the community, the economy, and the polity. The program consists of a core of labor courses supplemented by introductory liberal arts studies which provide (1) basic communication skills, (2) conceptual tools of analysis, and (3) a more general cultural context for the examination of labor problems.

This major leads to the degree of Associate in Arts. To graduate, 60 credits are required.

I. General Education Requirements (21 credits)	<i>Credits</i>
A. Communication skills	
English selection, speech communication selection	6
B. Humanities, natural and social sciences	15
Biological science, humanities, mathematics, physical science, and social science selections	
II. Requirements for the Major (39 credits)	
A. General	
Econ. 14, Hist. 21, Pl.Sc. 1, Psy. 2, Soc. 1	15
Management selection, speech selection	6
B. Labor Studies	18
L.S. 100*, 102, 103, 104, 156, 296	
	—
	60

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\*Will be accepted toward the baccalaureate major in Labor Studies.



LETTERS, ARTS, AND SCIENCES\*

The objectives of this program are to broaden the student’s understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student’s interests or career plans. This program is a complete two-year degree program. However, graduates who later seek admission to baccalaureate programs may apply baccalaureate credits toward the new degree. Any 800-level credits taken in the Letters, Arts, and Sciences program are not applicable toward a baccalaureate degree.

This major leads to the degree of Associate in Arts. To graduate, 60 credits are required.

	<i>Scheduling Recommendation by Term Standing</i>	
	1-3	4-6
I. Required Courses (36 credits)		
Communication skills (9 credits)		
+ Engl. 10 (3), 20 (3)	x	—
Sp.Com. 200 (3)	x	—
Arts (6 credits)		
**Select 6 credits in any courses designated as arts	x	x
Humanities (6 credits)		
**Select 6 credits in any courses designated as humanities	x	x
Social and behavioral sciences (6 credits)		
**Select 6 credits in any courses designated as social and behavioral sciences	x	x
Science (6 credits)		
**Select 6 credits in any courses designated physical, biological, or earth sciences	x	x
Mathematics (3 credits)		
**Select 3 credits in mathematics (Math. 4, 6, 10 <i>not</i> acceptable), statistics, computer science, or philosophy (Phil. 12, 212 <i>only</i> )	x	x
II. Related Courses (9 credits)		
**Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, science and mathe- matics, and foreign language skills	x	x
III. Electives (15 credits)	x	x

\*The 45 required and related credits must be baccalaureate-level courses. For those intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a Bachelor of Arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken.

+ Students will be placed in Engl. 4, 10, or 30 on the basis of English Placement Test scores. If a student is placed in Engl. 30, successful completion of that course will satisfy the English requirement; in addition, 3 credits will be given for Engl. 10.

\*\*Courses which will satisfy the arts, humanities, social and behavioral sciences, and science and mathematics requirements are defined in the University-wide requirements for a Bachelor of Arts degree described in the *Baccalaureate Degree Programs* catalog. Please note that subject areas which are listed as acceptable under more than one category may be applied to *only one* category.

## MASS COMMUNICATIONS—ADVERTISING

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to advertising. At the present time this major is not being offered.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Engl. 4, Basic Writing Skills	3	Engl. 10, Composition and Rhetoric I	3
Journ. 800, History and Survey of Mass Communications	3	Journ. 811, Advertising Copywriting	3
So.St. 800, Human Cultures and the Individual	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	—		—
	10		12

THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Human. 800, Sources of Morality	3	Arts 1, The Arts	3
Journ. 812, Advertising Layout	3	Journ. 813, Advertising Media and Campaigns	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	—		—
	10		10

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Human. 1, Values of the Western Cultural Heritage	3	Music 5, The Fundamentals of Music Appreciation	3
Journ. 814, Newspaper Advertising	3	Journ. 820, Newspaper Management	3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	—		—
	10		12

MASS COMMUNICATIONS—BROADCASTING

MASS COMMUNICATIONS—BROADCASTING

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to broadcasting.

To graduate, 61-63 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Journ. 200, Mass Media and Society	3	Math. 800, Business Mathematics	3
Sp.Com. 801, Survey of Broadcasting	3	Sp.Com. 802, Radio and Television Announcing	3
	<hr/> 9		<hr/> 9
THIRD TERM	Credits	FOURTH TERM	Credits
Sp.Com. 803, Basic Writing for Radio and Television	3	Human. 101, Modern Science and Human Values	3
*Humanities selection	3	Sp.Com. 804, Radio Programming, Production, and Performance	3
*Physical or biological science selection	3	Sp.Com. 200, Effective Speech	3
	<hr/> 9	*Arts selection	3
			<hr/> 12
FIFTH TERM	Credits	SIXTH TERM	Credits
Sp.Com. 280, Oral Interpretation	3	Music 5, Fundamentals of Music Appreciation	3
Sp.Com. 805, Television Programming, Production, and Performance	3	Sp.Com. 830, Directed Studies	1-3
*Social science selection	3	Thea. 109, The Dramatic Arts in the Mass Media	3
Elective	3	Elective	3
	<hr/> 12		<hr/> 10-12

\*To be selected with the approval of the program coordinator or adviser.

**MASS COMMUNICATIONS—JOURNALISM**

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to journalism.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
Engl. 4, Basic Writing Skills	3	Engl. 10, Composition and Rhetoric I	3
Journ. 800, History and Survey of Mass Communications	3	Journ. 801, Beginning News Writing	3
So.St. 800, Human Cultures and the Individual	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	—		—
	10		12
THIRD TERM		FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
Human. 800, Sources of Morality	3	Arts 1, The Arts	3
Journ. 802, Beginning Reporting	3	Journ. 803, Fundamentals of Editing	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	—		—
	10		10
FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
Human. 1, Values of the Western Cultural Heritage	3	Music 5, The Fundamentals of Music Appreciation	3
Journ. 804, Reporting the Community	3	Journ. 820, Newspaper Management	3
So.St. 801, Critical and Visionary Concepts of Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	—		—
	10		12



**MECHANICAL ENGINEERING TECHNOLOGY  
(Drafting and Design Technology)**

This major is intended to prepare detail or layout draftsmen and junior designers for manufacturing industries as well as for the many concerns engaged in installation or erection work. The principal objective is to prepare young men and women for employment in machine design, tool and die design, or structural layout.

To graduate, 73-74 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.G. 12, Spatial Analysis	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		
	<hr/>		<hr/>
	12		11

THIRD TERM	<i>Credits</i>	+ SUMMER TERM	<i>Credits</i>
Cmp.Sc. 101, Introduction to Algorithmic Processes	3	I.E. 812, Manufacturing Processes	3
E.Mch. 811, Elementary Mechanics	3		
I.E. 811, Manufacturing Materials and Processes	3		
Math. 803, Technical Calculus	3		
	<hr/>		
	12		

FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
E.G. 803, Advanced Engineering Drawing	3	I.E. 815, Production Design	3
E.Mch. 813, Strength and Properties of Materials	3	M.E. 805, Kinematics	3
I.E. 315, Industrial Organization and Administration	3	Social science selection	3
Sp.Com. 200, Effective Speech	3	Technical selection	2-3
	<hr/>		<hr/>
	12		11-12

SIXTH TERM	<i>Credits</i>
A.E. 809, Structure Design	3
M.E. 810, Product Design	3
Humanities selection	3
Technical selection	3
	<hr/>
	12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

+ Summer term to be taken at the University Park Campus.

## MEDICAL LABORATORY TECHNOLOGY

This two-year program (eight terms) is designed to provide the necessary general and technical training for hospital personnel between the level of the Medical Laboratory Technician (certificate program) and the Medical Technologist. The program includes one full year of intensive clinical experience at an affiliated hospital and the theoretical background necessary for the clinical procedures performed by the registered Medical Laboratory Technician (associate degree program).

This two-year program starts in the summer term. To graduate, 71-72 credits are required.

### I. General Education Requirements (39-40 credits)

Communications (6 credits)

Engl. 10 (3)

Sp.Com. 200 (3)

Quantification (4 credits)

Math. 4, 5, or 10 (3)

Cmp.Sc. 1 (1)

Natural Science (20-21 credits)

Biol. 29 (4)

Biol. 41 (3)

Biol. 42 (1)

Chem. 12 (3-4)

Chem. 14 (1)

Chem. 34 (3)

Micrb. 1 (3)

Micrb. 2 (2)

Arts and Humanities (3 credits)

Selection (3)

Social and Behavioral Sciences (6 credits)

Selection (6)

### II. \*Requirements for the Major (32 credits)

Bioch. 100 (8)

Micrb. 101 (8)

Micrb. 102 (8)

Micrb. 801 (8)

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\*Medical Laboratory Technician clinical experience (32 credits). Affiliation now exists with St. Joseph Hospital, Hazleton, Pennsylvania.

**METALLURGICAL ENGINEERING TECHNOLOGY (MET E)**

This program prepares students for positions in the metallurgical and metals-oriented industries as technical personnel in research laboratories and in quality control, and as supervisors of service groups and of production operations.

To graduate, 72 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Phys. 150, Technical Physics	3
E.G. 1, Engineering Drawing	2	Met.E. 800, Metallurgical Laboratory Practice	4
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	—		—
	11		13

THIRD TERM	<i>Credits</i>	SUMMER TERM	<i>Credits</i>
Chem. 14, Experimental Chemistry	1	I.E. 812, Manufacturing Processes; or Met.E. 806, Summer Field Practice	3
Met.E. 801, Principles of Extractive Metallurgy	2		
Phys. 151, Technical Physics	3		
Math. 803	3		
Engl. 10, Composition and Rhetoric I; or Engl. 826, Report Writing	3		
	—		
	12		

FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
E.E. 800, Applied Electricity	2	Econ. 14, Principles of Economics	3
Met.E. 802, Physical Metallurgy	3	Met.E. 804, Ferrous Metallurgy	3
Met.E. 803, Materials Testing	3	Sp.Com. 200, Effective Speech	3
Cmp.Sc. 101, Introduction to Algorithmic Processes	3	Humanities selection	3
	—		—
	11		12

SIXTH TERM	<i>Credits</i>
I.E. 809, Inspection and Quality Control	3
Met.E. 805, Non-Ferrous Metallurgy	3
Met.E. 807, Metallurgical Operations	1
Social science selection	3
	—
	10

## MINING TECHNOLOGY

A student in mining technology receives a blend of basic sciences, mathematics, communications, humanities and social sciences, and applied courses during the period of study. These courses are sequenced so that basic principles of physical processes are used to understand the specific procedures involved in mining. The curriculum covers a complete spread of material at a level consistent with potential careers of mining technology graduates.

This major prepares students for career positions of a management-oriented or an engineering-oriented nature in the mining industry. Many of the graduates of this program, after serving the necessary apprenticeship, become certified managers in their fields.

The Maintenance Option prepares a student to become a maintenance supervisor. Initially, the graduate would work as an apprentice electrician or mechanic and would gain experience in repairs and in planned maintenance. Once certification is obtained, it is expected that the graduate would become involved with maintenance planning, working as or with the chief mine mechanic or chief mine electrician.

The Production Option prepares a student to become a mine foreman or an engineering aide. Initially, some of the assigned duties are to run transit and act as survey party chief, keep mine maps up-to-date and make projections, take samples and run analyses, make time studies, and assist with materials handling layouts.

The Surface Mining Option prepares a student for work as an engineering aide or as a supervisor in surface mining. Initially, the graduate works as an assistant to engineers or to other supervisors. After a period of training, it is expected that the graduate may become involved in such areas of mining as pit design, equipment utilization, environmental control, reclamation, and mine laws and regulations.

To graduate in Mining Technology, 70 credits are required.

### Maintenance Option

FIRST TERM	Credits	SECOND TERM	Credits
Econ. 14, Principles of Economics	3	Cmp.Sc. 1, Basic Computer Programming	1
Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
*Math. 801, Technical Mathematics	3	Sp.Com. 200	3
Mng.T. 800, Mining Technology Orientation	1	*Math. 802, Technical Mathematics	3
		Phys. 150, Technical Physics	3
	<hr/> 10		<hr/> 12
THIRD TERM	Credits	FOURTH TERM	Credits
Chem. 11, Introductory Chemistry	3	Mng.T. 807, Electrical Mine Machine Circuits	3
E.Mch. 811, Elementary Mechanics	3	Mng.T. 810, Mine Machine Dynamics	3
Mng.T. 804, Mine Plant Technology	3	Geosc. 1, Physical Geology; or	
**Math. 803, Technical Calculus	3	Geosc. 20, Our Earth	3
	<hr/> 12	Humanities selection	3
			<hr/> 12



MINING TECHNOLOGY

FIFTH TERM	Credits	SIXTH TERM	Credits
Mng.T. 801, Coal Mining Technology	3	Engl. 826, Report Writing	3
Mng.T. 802, Mine Ventilation	3	Mng.T. 809, Mine Machinery Hydraulics	3
Mng.T. 808, Mine Power Distribution	3	Mgmt. 800, Principles of Management	3
Mng.T. 806, Mine Management and Law	3	Mng.T. 811, Practicum in Mine Maintenance	3
	12		12

\*The series of Math. 5 and 6 may substitute for the series of Math. 801 and 802.

\*\*Math. 161 may substitute for Math. 803.

Production Option

FIRST TERM	Credits	SECOND TERM	Credits
Econ. 14, Principles of Economics	3	Cmp.Sc. 1, Basic Computer Programming	1
Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
*Math. 801, Technical Mathematics	3	Sp.Com. 200	3
Mng.T. 800, Mining Technology Orientation	1	*Math. 802, Technical Mathematics	3
	10	Phys. 150, Technical Physics	3
			12

THIRD TERM	Credits	FOURTH TERM	Credits
Chem. 11, Introductory Chemistry	3	Geosc. 1, Physical Geology; or Geosc. 20, Our Earth	3
E.Mch. 811, Elementary Mechanics	3	Mn.Pr. 61, Introduction to Coal Preparation	3
Mng.T. 804, Mine Plant Technology	3	Humanities selection	3
**Math. 803, Technical Calculus	3	Mining technology selection	3
	12		12

FIFTH TERM	Credits	SIXTH TERM	Credits
Mng.T. 801, Coal Mining Technology	3	Engl. 826, Report Writing	3
Mng.T. 802, Mine Ventilation	3	Mng.T. 803, Strata Control	3
Mng. 30, Introduction to Mining Engineering	3	Mng.T. 805, Mine Systems Technology	3
Mng. 806, Mine Management and Law	3	Mng. 23, Mineral Land and Mine Surveying	3
	12		12

\*The series of Math. 5 and 6 may substitute for the series of Math. 801 and 802.

\*\*Math. 161 may substitute for Math. 803.

## Surface Mining Option

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Cmp.Sc. 1, Basic Computer Programming	1
Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
*Math. 801, Technical Mathematics	3	Econ. 14, Principles of Economics	3
Mng.T. 800, Mining Technology Orientation	1	*Math. 802, Technical Mathematics	3
	—	Phys. 150, Technical Physics	3
	10		—
			12
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
**Math. 803, Technical Calculus	3	Engl. 826, Report Writing; or Mng. 23, Mineral Land and Mine Surveying	3
E.Mch. 811, Elementary Mechanics	3	Mng.T. 815, Surface Mining Technology	3
Geosc. 20, Our Earth	3	Mn.Pr. 61, Introduction to Coal Preparation	3
Mng.T. 804, Mine Plant Technology	3	Technical selection	3
	—		—
	12		12
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Mng.T. 816, Elements of Surface Mine Design	3	Engl. 826, Report Writing; or Mng. 23, Mineral Land and Mine Surveying	3
Mng.T. 817, Surface Mining Production Technology	3	Mng.T. 806, Mine Management and Law	3
Sp.Com. 200, Effective Speech	3	Mng.T. 818, Surface Mining Hydrology	3
Humanities selection	3	Mng.T. 819, Reclamation Technology	3
	—		—
	12		12

\*The series of Math. 5 and 6 may substitute for the series of Math. 801 and 802.

\*\*Math. 161 may substitute for Math. 803.

NUCLEAR ENGINEERING TECHNOLOGY

This major is designed to provide technically trained personnel to support the rapidly developing nuclear industry between the levels of high school graduate and professional engineer. The wide scope of training prepares the nuclear technologist for careers in radiation safety, reactor operations, radioisotope handling, nuclear and control instrumentation, fuel fabrication, and health physics. A nuclear technologist may work as a radiological safety technician, engineering aide, or as a reactor operator at a nuclear facility.

To graduate, 73 credits are required.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 801, Fundamentals of D.C. Circuits	3
Engr. 2, Engineering Orientation	1	E.E. 809, D.C. Circuits Laboratory	2
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	—		—
	12		12
THIRD TERM		FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Nuc.E. 800, Nuclear and Atomic Science	2
E.E. 814, Electrical Circuits	4	Nuc.E. 805, Principles of Measurement	3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3	Social science selection	3
Math. 803, Technical Calculus	3	Sp.Com. 200, Effective Speech	3
	—		—
	13		11
FIFTH TERM		+ SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
*Engl. 826, Report Writing	3	Nuc.E. 803, Elements of Nuclear Power Generation	3
M.E. 807, Heat Transfer	3	Nuc.E. 804, Introduction to Reactor Technology	3
Nuc.E. 801, Radiological Safety	2	Nuc.E. 812, Nuclear Technology Laboratory	3
Nuc.E. 802, Elements of Nuclear Technology	2	Nuc.E. 814, Reactor Technology Laboratory	3
Humanities selection	3		—
	—		—
	13		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

+ Sixth term is to be taken at the University Park Campus.

## RAILWAY ENGINEERING TECHNOLOGY

The objective of this program is to prepare railway technicians for the revitalized railway industry. Such individuals will be able to run surveys, solve right-of-way and drainage problems, deal with track layout and maintenance problems, and work with basic railway structures. Graduates of the Railway Engineering Technology program may find employment as track foremen, track supervisors, track inspectors, and management trainees with the American railroads; as track inspectors with the Federal Railroad Administration; and as designers and estimators with consulting engineers.

To graduate, 72-73 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric	3	E.G. 12, Spatial Analysis	2
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	—		—
	12		11
THIRD TERM	<i>Credits</i>	SUMMER TERM	<i>Credits</i>
C.E. 812, Curves and Earthwork	3	C.E. 813, Practical Field Problems	4
C.E. 818, Route Surveying	2		
E.Mch. 811, Elementary Mechanics	3		
Math. 803, Technical Calculus	3		
	—		
	11		
FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
C.E. 840, Hydrology and Drainage	3	C.E. 841, Economic Railway Location and Geometric Design	3
E.Mch. 813, Strength and Properties of Materials	3	E.E. 800, Applied Electricity	2
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
Sp.Com. 200, Effective Speech	3	Social science selection	3
	—		—
	12		11
SIXTH TERM	<i>Credits</i>		
C.E. 842, Railway Track Maintenance and Operation	3		
C.E. 843, Railway Track Structure Design and Construction	3		
Technical selection	2-3		
Humanities selection	3		
	—		
	11-12		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20.



## RECREATION AND PARKS

Graduates of this major, which prepares students to assume leadership roles with recreation program participants, may organize and lead recreation activities in program areas such as sports, performing arts, or nature and camping. The graduate may supervise such facilities as community centers, parks, special sports centers, and nature centers in a variety of settings, e.g., municipal recreation and park departments, youth-serving agencies, hospitals, schools, nursing homes, and private or commercial agencies. To graduate, 66 credits are required for the associate degree.

### RECREATION LEADERSHIP OPTION

I. General Education (38 credits)	<i>Credits</i>
A. Communication skills	9
Engl. 4 or 10 (3)	
Engl. 10 or 20 (3)	
Sp.Com. 200 (3)	
B. Science	6
6 credits selected from: Biol. 111; Bi.Sc. 1, 3, 4; Chem. 11;	
Geosc. 20; Math. 800; Ph.Sc. 7	
C. Arts and humanities	9
A.Ed. 14 (3)	
Thea. 104 (3)	
Thea. 806 (3)	
D. Social and behavioral sciences	6
Psy. 2 or 37 (3)	
Soc. 1 or 5 (3)	
E. Health and physical education	8
Hl.Ed. 303 (2)	
Ph.Ed. 5 (3)	
Team sports	
Lifetime sports	
Swimming	
Ph.Ed. 803, Games for Children (1)	
Ph.Ed. 804, Dance and Gymnastics (1)	
Ph.Ed. 807, Adapted Activities (1)	
II. Requirements for the Major (20-21 credits)	20-21
Rc.Pk. 120, Man and Leisure (3)	
Rc.Pk. 130, Outdoor Living Skills (1)	
Rc.Pk. 190, Perspectives for the Recreation and Parks Professional (3)	
Rc.Pk. 230, Camp Counseling (2); or Rc.Pk. 877, Therapeutic Recreation Program (3)	
Rc.Pk. 236, Theory and Practice of Recreation Leadership (3)	
Rc.Pk. 295, The Scope of Recreation and Parks Services (1)	
Rc.Pk. 850, Field Practicum (3)	
Rc.Pk. 856, Recreation Program Planning (3)	
Rc.Pk. 875, Introduction to Therapeutic Recreation (3)	
III. Electives (5-6 credits)	5-6

## RETAILING

This major, which trains for positions in retail stores, provides a minimum foundation of a general education, a basis for understanding customer wants and needs, and a technical knowledge of retail procedures. It includes one term of supervised store experience. The major constitutes a well-balanced program for individual growth and development as well as for specialized employment training. To graduate, 66 credits are required.

I. General Education Requirements (21 credits)	<i>Credits</i>
A. Communication skills 6 credits in English, Sp.Com. 200	9
B. Biological and physical sciences A minimum of 3 credits in each area	6
C. Arts and humanities 3 credits from either area	3
D. Social and behavioral sciences Selected with adviser's approval	3
II. Requirements for the Major (45 credits)	
A. Courses in retailing Mktg. 804, 805, 806; H.Dev. 395; M.E.R. 213, 214, 301; Rtl. 840, 850	29
B. Courses in individual development I.F.S. 16 (1) plus adviser's recommendations for other college courses	7
C. Professional selections Selected with adviser's approval	9

SCIENCE

This major is primarily designed to provide for the basic educational needs of students who desire to pursue professional programs as outlined by medical accrediting societies. The program provides a fundamental group of science courses of value to those who seek positions in government or industry where such knowledge is necessary or desirable. To graduate, 64 credits are required.

		<i>Scheduling Recommendation by Term Standing</i>	
		1-3	4-6
I. Required Courses: 52 credits			
A. Communication skills (6 credits)			
Engl. 10 (3)	x	—	
Sp.Com. 200 (3)	—		x
B. Social and behavioral sciences (6 credits)	x		x
C. Arts and humanities (6 credits)			
Human. 101 (3)	—		x
Selection (3)	—		x
D. Quantification (9 credits)			
Math. 10 (3), 20 (3)	x	—	
Cmp.Sc. 101 (3)	—		x
E. Natural sciences (25 credits)			
Biol. 29 (4), 111 (3), Chem. 11 (3), Phys. 150 (3)	x	—	
Biol. 41 (3), Micrb. 6 (2), 7 (1), Phys. 151 (3)	—		x
Chem. 34 (3) or Bioch. 1 (3)	—		x
II. Related Courses: 12 credits			
Select 12 credits from the following biological, mathematical, and physical science courses:	x		x
Biol. 33 (3), 42 (1), 112 (3), 113 (3), Bi.Sc. 3 (3), Chem. 35 (3), 102 (3), Astro 1 (3), Stat. 200 (4), Math. 121 (3), Phil. 212 (3), Phys. 297 (3)			

## SCIENCE

## Radiologic Technologist Radiographer Option

This option is a twenty-seven-month program and requires nine terms to complete. For graduation, 65-66 credits are required.

	<i>Scheduling Recommendation by Term Standing</i>		
	1-3	4-6	7-9
I. Required Courses: 52-53 credits			
A. Communication skills (6 credits)			
Engl. 10 (3)	x	—	—
Sp.Com. 200 (3)	—	x	—
B. Social and behavioral sciences (6 credits)	x	x	—
C. Arts and humanities (6 credits)			
Human. 101 (3)	—	x	—
Selection (3)	—	x	—
D. Quantification (9-10 credits)			
Math. 10 (3); Math. 120 (3) or Math. 161 (3) or			
Stat. 200 (3)	x	—	—
Cmp.Sc. 101 (3)	—	x	—
E. Natural sciences (25 credits)			
Biol. 29 (4), 111 (3), Chem. 11 (3), Phys. 150 (3)	x	—	—
Biol. 33 (3), 41 (3), Phys. 151 (3), 297 (3)	—	x	—
II. Related Courses (13 credits)			
R.T.R. 1 (1), 20 (1), 30 (1)	x	—	—
R.T.R. 40 (5), 50 (1), 60 (1)	—	x	—
R.T.R. 70 (1), 80 (1), 90 (1)	—	—	x



SOCIOLOGY

This major introduces to students the study of human groups and their relationships to each other and to the environment; it enables students to gain some proficiency in the scientific study of group structures and processes. A further objective is to help students become more skillful in working with community institutions, agencies, and organizations either through gainful employment or as a volunteer.

To graduate, 60 credits are required.

I. General Education (33 credits)	<i>Credits</i>
A. Speaking and writing skills	9
Engl. 10 and 20 (6)	
Sp.Com. 200 (3)	
B. Mathematics	3
Math. 4, 6, and 10 are not acceptable	
C. Science	6
Three credits in each of two groups listed below:	
a. Chemistry, physical science, physics	
b. Biological science, biology, biochemistry, microbiology	
c. Astronomy, geological science, meteorology, physical geography	
d. Computer science, statistics, symbolic logic (Phil. 12 or 212 only)	
D. Arts	3
E. Humanities	6
F. Social and behavioral sciences	6
(Not to include sociology)	
II. Requirements for the Major (18 credits)	18
Soc. 1 (3)	
Soc. 3 or 5 (3)	
Soc. 7 (3)	
*Additional credits in sociology (9)	
III. + Electives (9 credits)	9

\*Selected in consultation with the student's adviser to reflect the student's career and/or basic interests.  
+ For students planning to transfer to the B.A. program in either sociology or social welfare, one college-level course in a foreign language must be passed with at least a grade of C. It is also recommended that University Baccalaureate Degree Requirements be considered in so far as practical.

## SOLAR HEATING AND COOLING TECHNOLOGY

This major is designed to prepare solar technicians for the expanding solar and related industries. They will be prepared to help design, specify, test, supervise installation, and make cost estimates for residential and commercial solar energy-assisted heating and cooling systems involving the use of recognized standard components.

To graduate, 72 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
A.E. 801, Building Materials	3	A.E. 802, Methods of Construction	3
E.G. 3, Architectural Graphics	2	E.Mch. 811, Elementary Mechanics	3
*Engl. 4, Basic Writing Skills; or		Math. 802, Technical Mathematics	3
Engl. 10, Composition and		Phys. 150, Technical Physics	3
Rhetoric I	3		—
Math. 801, Technical Mathematics	3		12
S.T. 801, Introduction to Solar			
Technology	2		
	—		
	13		
THIRD TERM	Credits	FOURTH TERM	Credits
E.Mch. 813, Strength and		A.E. 803, Plumbing and Fire	
Properties of Materials	3	Protection	3
*Engl. 10, Composition and Rhetoric		Cmp.Sc. 101, Introduction to	
I; or Engl. 20, Composition and		Algorithmic Processes	3
Rhetoric II; or Engl. 826, Report		M.E. 881, Elementary Thermo and	
Writing	3	Fluid Dynamics	2
Math. 803, Technical Calculus	3	Sp.Com. 200, Effective Speech	3
Phys. 151, Technical Physics	3		—
	—		11
	12		
FIFTH TERM	Credits	SIXTH TERM	Credits
A.E. 809, Structure Design	3	A.E. 804, Heating, Ventilating, and	
S.T. 802, Solar Collectors	3	Air Conditioning Layout	3
S.T. 803, Heat Storage and		S.T. 804, Analysis of Solar Heating	
Distribution Systems	3	and Cooling Systems	3
Social science selection	3	S.T. 805, Economics of Solar	
	—	Technology Systems	3
	12	Humanities selection	3
			—
			12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

# **SURVEYING TECHNOLOGY**

The objectives of the major are to provide a knowledge of the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys, and to develop trained personnel who understand the relation between the precision of measurements and the interpretation of data in addition to having an appreciation of the skills and equipment needed to make precise measurements in the field of surveying.

To graduate, 73-74 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	*Eng. 4, Basic Writing Skills; or	
Engr. 2, Engineering Orientation	1	Engl. 10, Composition and	
Math. 801, Technical Mathematics	3	Rhetoric I	3
Phys. 150, Technical Physics	3	Math. 802, Technical Mathematics	3
—	—	Phys. 151, Technical Physics	3
	12	—	—
			11

THIRD TERM	<i>Credits</i>	SUMMER TERM	<i>Credits</i>
C.E. 812, Curves and Earthwork	3	C.E. 813, Practical Field Problems	4
C.E. 818, Route Surveying	2		
Cmp.Sc. 1, Basic Computer			
Programming	1		
*Engl. 10, Composition and Rhetoric			
I; or Engl. 20, Composition and			
Rhetoric II	3		
Math. 803, Technical Calculus	3		
—	—		
	12		

FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
C.E. 816, Special Surveys	3	C.E. 810, Statistics and Least	
C.E. 817, Cartographic Techniques	2	Squares	3
E.G. 12, Spatial Analysis	2	C.E. 814, Photogrammetry	3
E.Mch. 810, Basic Mechanics	2	*Engl. 826, Report Writing	3
Sp.Com. 200, Effective Speech	3	Pl.Sc. 1, American National	
—	—	Government	3
	12	—	—
			12

SIXTH TERM	<i>Credits</i>
C.E. 815, Geodetic Surveying	3
C.E. 890, Legal Aspects of	
Surveying	2
Humanities selection	3
Technical selection	2-3
—	—
	10-11

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

## TELECOMMUNICATIONS

The field of telecommunications includes the transmission of voice and digital signals by telephone, telegraph, radio, television, and satellite. Graduates of this option will be engineering technicians who help select, design, install, operate, maintain, troubleshoot, and repair modern telecommunications systems.

Future uses for telecommunications systems include electronic mail, electronic shopping, home computer terminal tie-ins, remote utility meter reading, and the transmission of biomedical data between hospitals, libraries, and doctors' offices.

To graduate, 75 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3	I.E. 805, Economics of Industry	2
	—		—
	12		13
THIRD TERM	Credits	FOURTH TERM	Credits
Cmp.Sc. 1, Basic Computer Programming	1	E.E. 804, A.C. Circuits	2
E.E. 814, Electrical Circuits	4	E.E. 807, A.C. and Electronics Laboratory	2
E.E. 818, Electrical Circuits Laboratory	1	E.E. 810, Fundamentals of Semiconductors	3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3	Social science selection	3
Math. 803, Technical Calculus	3	TelCm. 840, Introduction to Telecommunications Systems	2
	—		—
	12		12
FIFTH TERM	Credits	SIXTH TERM	Credits
E.E. 816, Linear Electronic Circuits	3	E.E. 817, Advanced Electronics	4
E.E. 821, Linear Electronics Laboratory	1	E.E. 820, Advanced Electronics Laboratory	2
E.Mch. 810, Basic Mechanics	2	Sp.Com. 200, Effective Speech	3
Humanities selection	3	TelCm. 843, Transmission	3
TelCm. 841, Switching and Traffic	3	TelCm. 844, Advanced Telecommunications Laboratory	1
TelCm. 842, Elementary Telecommunications Laboratory	1		—
	—		13
	13		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 or Engl. 826.



WILDLIFE TECHNOLOGY

This program will prepare a student in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and care, maintenance, and propagation of animals. They will support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research.

To graduate, 65 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 10, Introductory Engineering Graphics	1	C.E. 809, Topographic Drawing	2
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I; or Engl. 826, Report Writing	3
For. 802, Dendrology	2	Math. 801, Technical Mathematics I	3
Wildl. 801, Introduction to Wildlife Management	3	Wildl. 804, Wildlife Mensuration	3
	—		—
	9		11

THIRD TERM	Credits	SUMMER TERM	Credits
Wildl. 803, Animal Identification	3	Wildl. 805, Field and Laboratory Techniques	3
Wildl. 812, Wildlife Field Surveys	3	Wildl. 806, Operational Procedures and Equipment	2
Wildl. 814, Habitat Management	3		—
	—		5
	9		

FOURTH TERM	Credits	FIFTH TERM	Credits
Sp.Com. 200, Effective Speech	3	For. 812, Elements of Project Supervision in Forestry	3
For. 808, Forest Protection	3	Wildl. 809, Animal Care	3
Wildl. 807, Outdoor Recreation	3	Wildl. 811, Aerial Photo Interpretation	4
Social science selection	3		—
	—		10
	12		

SIXTH TERM	Credits
Acctg. 816, Introductory Accounting Survey	3
Human. 801, Science, Technology, and Human Values	3
Wildl. 813, Fisheries Management for Technicians	3
	—
	9

# COURSE DESCRIPTIONS

## CREDITS AND HOURS

A credit requires three 75-minute periods per week of an average student's time. The distribution of that time between class activities (such as lecture, recitation, laboratory, field trips, etc.) and outside preparation varies from course to course.

Credits, classroom work, and laboratory work are indicated by three numbers in parentheses immediately following the course title.

1. The first number shows the maximum course credits and therefore the total time required by the course per week. For example, a 2-credit course normally requires 7½ hours per week for class activity and individual preparation.
2. The second number shows the periods of classroom work (a period is 75 minutes), including lecture, recitation, class discussion, demonstration, or various combinations of these.
3. The third number shows the periods of practicum room work (a period is 75 minutes), including laboratory, shop work, studio, drafting room, field trips, etc.

Courses numbered from 800 to 899 are reserved for the associate degree majors. Credit received for 800-series courses is not applicable to any baccalaureate degree program offered by the University with the exception of programs offered by Capitol Campus. Courses numbered from 1 to 399 carry baccalaureate credit and are required in most of the associate degree majors. Elective credit courses vary from campus to campus and term to term, and all of the courses listed below are not offered at each campus. Students may obtain information about the specific course offerings for a given campus from the appropriate *Schedule of Classes*.

## ACCOUNTING (ACCTG)

16. **INTRODUCTORY ACCOUNTING SURVEY (3:3:0)** Accounting for proprietorships, partnerships, and corporations for retailers and manufacturers; financial statement analysis. Students who have passed Acctg. 101 may not schedule this course.

101. **INTRODUCTORY FINANCIAL ACCOUNTING (3:2½:1)** Fundamentals of the collection, recording, summarization, and interpretation of accounting data.

102. **INTRODUCTORY MANAGERIAL ACCOUNTING (3:2½:1)** Actual and standard cost systems; managerial uses of cost data. Prerequisite: Acctg. 101.

801. **INTRODUCTORY ACCOUNTING (3:2:1)**

802. **INTRODUCTORY ACCOUNTING (3:2:1)** Prerequisite: Acctg. 801.

803. **INTERMEDIATE ACCOUNTING (3:3:0)** Financial accounting statements, concepts, and procedures; assets, liabilities, owners' equity, statement analysis. Prerequisite: Acctg. 802.

806. **FEDERAL TAX ACCOUNTING (3:3:0)** Federal tax revenue system as it affects the individual and business; tax planning, research, and preparation of returns. Prerequisite: Acctg. 802.

807. **MANAGERIAL ACCOUNTING (3:3:0)** Cost and budgetary control; preparation of information for decision making. Prerequisite: Acctg. 802.

816. **INTRODUCTORY ACCOUNTING SURVEY (3:3:0)** Fundamentals of accumulation and summarization of accounting data; emphasis on financial statement analysis and the uses of accounting in business.

## ADMINISTRATION OF JUSTICE (ADM J)

7. (Com.D. 7) **INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0)** An introduction to the study of community, community systems, and impact on the individual.

111. **INTRODUCTION TO THE AMERICAN CRIMINAL JUSTICE SYSTEM (3:3:0)** Criminal justice system including formulation of laws, extent of crime, processing and correction of offenders, victims.

## **AGRICULTURAL ECONOMICS**

221. **ISSUES IN THE AMERICAN CRIMINAL JUSTICE SYSTEM (3:3:0)** Examination of the models of the criminal process, functions of the justice system, and approaches to crime and punishment. Prerequisite: Adm.J. 111.

240. **RESEARCH STRATEGIES IN ADMINISTRATION OF JUSTICE (3:3:0)** A survey of the various research strategies relevant to the investigation of research questions in the administration of justice. Prerequisite: Stat. 200.

495. **FIELD PROJECT IN ADMINISTRATION OF JUSTICE (8:0:16)** Independent study and field research in an administration of justice setting different from required field project. Prerequisites: Adm.J. 394, 395, 396.

## **AGRICULTURAL ECONOMICS (AG EC)**

2. **MARKETING (3:3:0)** Development of methods and present status of marketing farm products; emphasis on assembling, grading, standardization, packing, processing, transporting, storing, financing, and distributing.

6. **FARM MANAGEMENT (3:2:2)** Organizing and operating farm businesses for financial success; measuring profits; improving efficiency of labor, land, and capital; getting started in farming.

800. **THE AGRICULTURAL ECONOMY (3:3:0)** A survey of the agricultural economy; nature, scope, and trends of ag-industry; and agriculture in the national perspective.

801. **MANAGEMENT OF COMMERCIAL FARMS (3:2:2)** Methods of analysis to determine farm organization, and profitability of alternate enterprises, capital investments, and use of production resources.

802. **AGRICULTURAL MARKETING AND SALES (3:3:0)** Marketing channels, services, costs, and price relationships involved in distributing farm supplies and agricultural products.

803. **INTRODUCTION TO AGRICULTURAL BUSINESS (3:3:0)** Economic principles which determine the supply, demand, and price of agricultural products and provide methodology for management decisions.

## **AGRICULTURAL ENGINEERING (AG E)**

800. **FARM POWER (2:1:2)** Principles and performance characteristics of tractors, electric motors, and other power units; application and maintenance of farm power equipment.

801. **FARM STRUCTURES AND UTILITIES (3:2:2)** Planning for efficient utilization of buildings, power, and equipment for materials handling and environmental control in agricultural production and processing.

## **AGRONOMY (AGRO)**

800. **FIELD AND FORAGE CROP PRODUCTION (3:2:2)** Production of field crops and pastures; management practices in relation to crop species; soil adaptation for desired yield and use.

## **AMERICAN STUDIES (AM ST)**

100. **INTRODUCTION TO AMERICAN STUDIES (3:3:0)** A study of selected attempts to identify and interpret movements and patterns in American culture. Prerequisite: fourth-term standing.

105. **AMERICAN POPULAR CULTURE AND FOLKLIFE (3:3:0)** Survey of popular culture, folklife, and ethnicity, synthesizing material from such areas as literature, media, entertainment, print, music, and film.



## ANIMAL INDUSTRY (A I)

800. **LIVESTOCK PRODUCTION (2:1:2)** The livestock and meat industry in the United States; management of commercial beef, swine, and sheep enterprises.

## ANTHROPOLOGY (ANTHY)

1. **INTRODUCTORY ANTHROPOLOGY (3:3:0)** Prehistoric and primitive people and cultures; primitive customs and institutions compared with those of modern man.

45. **CULTURAL ANTHROPOLOGY (3:3:0)** Beginnings of human culture; primitive economic life, society, government, religion, and art; cultural background of personality development.

148. **CULTURES OF THE MIDDLE EAST (3:3:0)** An introduction to the cultures of the Middle East.

## ARCHITECTURAL ENGINEERING TECHNOLOGY (A E)

801. **BUILDING MATERIALS (3:3:0)** Structural and architectural use of building materials and construction assemblies.

802. **METHODS OF CONSTRUCTION (3:1:5)** Materials and methods of construction used in buildings, as expressed in drawings. Prerequisites: A.E. 801, E.G. 3.

803. **PLUMBING AND FIRE PROTECTION (3:2:2)** Layout of plumbing and fire protection in buildings to meet code and usage requirements. Prerequisite or concurrent: A.E. 802.

804. **HEATING, VENTILATING, AND AIR CONDITIONING LAYOUT (3:2:2)** Fundamental calculations and layout of systems in buildings. Prerequisite: A.E. 803.

805. **ARCHITECTURAL RENDERING (2:0:6)** Architectural rendering techniques, including use of shade and shadow; color. Prerequisite: E.G. 3.

807. **ADVANCED CONSTRUCTION METHODS (3:1:5)** Integration of materials and systems in working drawings. Prerequisite: sixth-term standing.

808. **GRAPHIC ANALYSIS (2:0:6)** Graphical analysis of force systems, centers of gravity, stresses in framed structures, arches, walls, moments, and deflections of beams. Prerequisites: E.G. 12, E.Mch. 811.

809. **STRUCTURE DESIGN (3:1:5)** Elementary principles of structural design and detailing in timber, steel, and reinforced concrete; use of handbooks, fundamentals of structural and architectural drafting. Prerequisites: E.Mch. 813; A.E. 802 or E.G. 803.

810. **ARCHITECTURAL ENGINEERING OFFICE PRACTICE (3:3:0)** Procedures involved in production of contract documents, both drawings and specifications. Prerequisite: sixth-term standing.

812. **BUILDING LIGHTING AND ELECTRICAL LAYOUT (3:2:2)** Layout of lighting and electrical distribution in buildings.

814. **STEEL CONSTRUCTION (3:2:2)** Strength of materials as applied to the design of simple steel structures. Prerequisites: A.E. 802, E.Mch. 811.

815. **CONCRETE CONSTRUCTION (3:2:2)** Fundamentals of design and construction of reinforced concrete structures. Prerequisites: A.E. 802, E.Mch. 811.

830. **SELECTED TOPICS IN ARCHITECTURAL ENGINEERING TECHNOLOGY (3)** Individual or group work in architectural engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ART (ART)

110. **DESIGN: COLOR AND LIGHT (2:1:3)** The fundamentals of color. Investigation of color systems, color harmony, and the illusory nature of color on two-dimensional surfaces.

111. **DESIGN: THREE-DIMENSIONAL (2:1:3)** Introduction to design in three dimensions. Principles of visual organization in working with actual space and volume.



## ART EDUCATION

120. INTRODUCTION TO DRAWING (2:1:3) The study and practice of basic drawing as a way of understanding and communicating.

121A. TECHNIQUES FOR DRAWING (2:1:3) Drawing with emphasis upon observation, organization, and particular emphasis on the development of skills. Prerequisite: Art 120.

180. CERAMIC ARTS (2:1:3) Introduction to potter's wheel techniques; experiments with decorative application; includes the technical concerns for clay, glazes, and kilns. For non-art majors.

280. INTRODUCTORY CERAMIC ARTS (2:1:3) The fundamentals of ceramics, throwing, hand-building, and glazing; acquainting the student with ceramic materials, techniques, and philosophy. Prerequisite: 2 credits in studio art.

## ART EDUCATION (A ED)

14. INTRODUCTORY CRAFTS FOR TEACHERS (3:1:5) Direct experience with materials such as wood, clay, metal, paper, textiles, and plastics in relationship to the creative needs of children.

806. ARTS AND CRAFTS (3:1:5) An introduction to arts and crafts processes, experiences, and materials appropriate for community centers, playgrounds, etc.; designed for recreation leadership.

## ART HISTORY (ART H)

100. INTRODUCTION TO ART (3:3:0) An approach to the understanding of art through a critical analysis of selected works of architecture, painting, and sculpture. Students who have passed Art H. 110 may not schedule this course.

110. SURVEY OF WESTERN ART (3:3:0) General survey of major developments in architecture, painting, and sculpture in the Western world. Students who have passed Art H. 100 may not schedule this course.

214. MODERN ARCHITECTURE (3:3:0) Architecture and related arts of sculpture and painting from the end of the eighteenth century to the present day. Nontechnical in nature.

305. MODERN PAINTING (3:3:0) The development of painting from the French Revolution to the present.

307. AMERICAN ART (3:3:0) History of art in the English colonies and the United States from the seventeenth century to the present.

## THE ARTS (ARTS)

1. THE ARTS (3:3:0) Developing perception in the arts through relating the visual, musical, performing, and environmental arts.

## ASTRONOMY (ASTRO)

1. ASTRONOMICAL UNIVERSE (3:3:0) Nonmathematical description of the astronomical universe and the development of scientific thought. For nonscience majors. Students who have passed Astro. 90 may not schedule this course.

## BIOCHEMISTRY (BIOCH)

100. CLINICAL CHEMISTRY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15) Theoretical and practical concepts associated with clinical chemistry testing procedures used in the diagnosis of human diseases. Prerequisite: Chem. 34.

## BIOLOGICAL SCIENCE (BI SC)

1. **STRUCTURE AND FUNCTION OF ORGANISMS (3:3:0)** Origin, development, and cellular basis of life; fundamental principles, processes and structures of organisms. Students who have passed Biol. 27, 41, 111, 112, or 113 may not schedule this course.
2. **EVOLUTIONARY RELATIONSHIPS OF ORGANISMS (3:3:0)** Examination of the biological world in terms of reproduction, genetics, evolution, development, diversity; interrelationships and interdependence of organisms, populations, communities. Students who have passed Biol. 33, 111, 112, 113, or 222 may not schedule this course.
3. **MAN AND HIS ENVIRONMENT (3:3:0)** Kinds of environments; past and present uses and abuses of natural resources; disposal of man's wastes; prospects for the future. Students who have passed Biol. 210 or any other upper-level ecology course in biology may not schedule this course.
4. **BIOLOGY OF MAN (3:3:0)** A general survey of structure and function in man—from conception, through growth and reproduction, to death. Students who have passed Biol. 29 and 41 may not schedule this course.

## BIOLOGY (BIOL)

29. **MAMMALIAN ANATOMY (4:2:4)** Anatomy of a mammal, with special reference to that of man. Students who have passed Biol. 421 may not schedule this course.
33. **HUMAN GENETICS (3:3:0)** Human heredity and its individual and social implications. Students who have passed Biol. 222 may not schedule this course. Prerequisite: 3 credits in biological sciences.
41. **PHYSIOLOGY (3:3:0)** Normal functions of the animal body, with special reference to those of man. Students who have passed Biol. 472 may not schedule this course.
42. **PHYSIOLOGY LABORATORY (1:0:2)** Experiments demonstrating basic physiological principles with special reference to man. Prerequisite or concurrent: Biol. 41.
111. **LIFE SCIENCE (3:2:2)** Structure, metabolism, development, reproduction, and evolution of plants and animals.
112. **BOTANY (3:2:2)** Structure, metabolism, development, reproduction, and evolution of plants with an introduction to the fields of anatomy, morphology, and physiology. Prerequisite: Biol. 111.
113. **ZOOLOGY (3:2:2)** Morphology, physiology, development, life history, and evolution of animals with a consideration of their importance to human welfare. Prerequisite: Biol. 111.

## BIOMEDICAL EQUIPMENT TECHNOLOGY (B E T)

801. **PHYSIOLOGICAL TRANSDUCERS (3:2:2)** Study of the principles of operation and applications of devices used for the conversion of physiological events to electrical signals. Concurrent: E.E. 816.
802. **BIOMEDICAL INSTRUMENTATION AND SYSTEMS (3:2:2)** Introduction to the operating principles, calibration, and maintenance of biomedical instruments and systems with special emphasis given to patient safety. Prerequisite: B.E.T. 801.
803. **BIOMEDICAL EQUIPMENT LABORATORY (INTERNSHIP) (4:1:6)** Practical experience, within or related to the hospital environment, on a variety of biomedical instruments. Prerequisites: B.E.T. 804 and Biol. 41.
804. **MEDICAL AND CLINICAL EQUIPMENT (3:2:2)** Principles of operation of clinical, medical radiography, intensive care, anesthesia, respiratory, non-invasive imaging, and emergency equipment; hospital electrical safety. Prerequisite: B.E.T. 801.
830. **SELECTED TOPICS IN BIOMEDICAL EQUIPMENT TECHNOLOGY (3)** Individual or group work in biomedical equipment technology for students with specific occupational objectives. Prerequisite: fourth-term standing.

## **BUSINESS ADMINISTRATION (B A)**

803. COOPERATIVE PRACTICUM WITH BUSINESS OFFICES (6:0:12) Cooperative practical work with business offices under the supervision of the instructor.

## **BUSINESS LAW (B LAW)**

243. LEGAL ENVIRONMENT OF BUSINESS (3:3:0) Social control through law: courts, basic policies underlying individual and contractual rights in everyday society. Prerequisite: fourth-term standing.

843. INTRODUCTION TO BUSINESS LAW (3:3:0) Legal institutions; basic legal principles pertaining to individual and contractual rights, with special emphasis on business operations and transactions.

850. REAL ESTATE LAW (3:3:0) Basic legal principles involved in the negotiation of real estate transactions. Prerequisite: B.Law 843.

## **BUSINESS LOGISTICS (B LOG)**

102. PHYSICAL DISTRIBUTION (3:3:0) Physical distribution function in business; role played by transportation, warehousing, location, inventory control; concept of a business logistics system. Prerequisite: fourth-term standing.

104. TRANSPORT SYSTEMS (3:3:0) Conceptual model of a transport system; environmental relationships; modal components and internal constraints, with special application to the United States. Prerequisite: fourth-term standing.

206. TRAFFIC MANAGEMENT (3:3:0) Analysis of the traffic function in the logistics system. Evaluation of routes, rates, and shipping document procedures. Prerequisite: B.Log. 102 or 104.

## **CHEMICAL ENGINEERING TECHNOLOGY (CH E)**

800. TECHNICAL CALCULATIONS (3:3:0) Engineering units and their conversion. Technique of solving elementary problems in industrial stoichiometry, material balances, and heats of reaction. Prerequisite or concurrent: Chem. 13 and 15.

802. CHEMICAL TECHNOLOGY (3:3:0) Introductory discussion and problems relating to flow of fluids and transfer of heat. Prerequisite: fourth-term standing.

803. CHEMICAL TECHNOLOGY (3:3:0) Elementary discussion and problems involving evaporation, distillation, and air-water interaction. Prerequisite: Ch.E. 800.

820. CHEMICAL TECHNOLOGY LABORATORY (4:2:6) Measurements in fluid flow, heat transfer, distillation, mass transfer; chemical analytical techniques; industrial laboratory report writing. Prerequisite or concurrent: Ch.E. 803.

830. INDUSTRIAL CHEMISTRY (3:3:0) The commercial preparation of important chemicals and derivatives with emphasis upon the chemistry involved and the flow of material. Prerequisites or concurrent: Chem. 13 and 15.

831. SELECTED TOPICS IN CHEMICAL ENGINEERING TECHNOLOGY (3) Individual or group work in chemical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## **CHEMISTRY (CHEM)**

11. INTRODUCTORY CHEMISTRY (3:2:2) Selected principles and applications of chemistry. Prior study of chemistry not assumed.

12. CHEMICAL PRINCIPLES (3-4) Basic concepts and quantitative relations. Prerequisite: Satisfactory performance on placement examination—students take Chem. 12 for 3 credits. Unsatisfactory performance on placement examination—students take Chem. 12 for 4 credits.



13. **CHEMICAL PRINCIPLES (3:3:0)** Continuation of Chem. 12, including introduction to the chemistry of the elements. Prerequisite: Chem. 12. Prerequisite or concurrent: Chem. 14.
14. **EXPERIMENTAL CHEMISTRY (1:0:3)** Introduction to quantitative experimentation in chemistry. Prerequisite or concurrent: Chem. 12.
15. **EXPERIMENTAL CHEMISTRY (1:0:3)** Continuation of Chem. 14 with emphasis on analytical procedures. Prerequisite: Chem. 14. Prerequisite or concurrent: Chem. 13.
23. **INTRODUCTION TO MODERN ANALYTICAL CHEMISTRY (4:2:4)** Contemporary methods of chemical and instrumental analysis, including potentiometric titration, specific ion electrodes, spectrophotometry, and chromatography. Prerequisite: Chem. 15.
30. **ORGANIC CHEMISTRY (3:3:0)** Principles and theories; nomenclature; chemistry of the functional groups; applications of spectroscopy. Prerequisite: Chem. 13. Prerequisite or concurrent: Chem. 15.
31. **ORGANIC CHEMISTRY (2:2:0)** Continuation of Chem. 30. Prerequisite: Chem. 30.
33. **ORGANIC CHEMISTRY (2:2:0)** Continuation of Chem. 31, especially the chemistry of polyfunctional organic molecules. Prerequisite: Chem. 31.
34. **ORGANIC CHEMISTRY (3:3:0)** Introduction to organic chemistry with emphasis on the properties of organic compounds of biochemical importance. Prerequisite: Chem. 11 or 12.
35. **ORGANIC CHEMISTRY (3:2:4)** Introduction to organic chemistry with emphasis on the identification of organic compounds by characteristic chemical reactions and by spectroscopy. Prerequisite: Chem. 34.
36. **LABORATORY IN ORGANIC CHEMISTRY (2:0:6)** Basic laboratory operations; applications of theories and principles. Prerequisite or concurrent: Chem. 31.
102. **ENVIRONMENTAL CHEMISTRY (3:3:0)** Applications of chemistry to environmental problems, including air, water, thermal pollution; pesticides; drugs and birth control agents; food additives; etc. For nonchemistry majors; chemistry majors will not receive credit.
800. **GENERAL CHEMISTRY (3:2:3)** Basic principles of chemistry; properties and uses of some industrially important elements and compounds.

## CIVIL ENGINEERING TECHNOLOGY (C E)

809. **TOPOGRAPHIC DRAWING (2:0:4)** Conventional mapping symbols; constructing topographic maps from stadia notes; estimating quantities from topographic maps. Prerequisite: E.G. 1 or 10. Prerequisite or concurrent: C.E. 811 or Wildl. 812.
810. **STATISTICS AND LEAST SQUARES (3:2:2)** Frequency distribution; histograms; frequency polygons; measures of central tendency; dispersion; uses of normal curve; least squares applied to surveying problems. Prerequisite: Math. 803. Prerequisite or concurrent: C.E. 815.
811. **PLANE SURVEYING (3:2:3)** Theory of plane surveying; use, care, and adjustments of surveying equipment; traversing, areas, leveling, stadia, and plane table mapping. Prerequisite or concurrent: Math. 801.
812. **CURVES AND EARTHWORK (3:2:3)** Computation and laying out of horizontal and vertical curves; calculation of cut and fill; setting slope stakes for construction. Prerequisite or concurrent: C.E. 811, Math. 802.
813. **PRACTICAL FIELD PROBLEMS (4:1:9)** Geodetics, topography, field astronomy; route location; hydrographic surveys; land subdivision; use of electronic measuring devices. Prerequisites: C.E. 812, 818.
814. **PHOTOGRAMMETRY (3:2:3)** Interpretation and use of aerial photographs; mapping by photogrammetric methods; application of aerial and terrestrial photographic surveying to specific engineering problems. Prerequisite: C.E. 818.
815. **GEODETIC SURVEYING (3:2:3)** Precision vertical and horizontal control surveys; level nets; reciprocal leveling; triangulation; state plane coordinates; astronomic observations for azimuth and latitude. Prerequisites: C.E. 811, Math. 802.



## CLOTHING AND TEXTILES

816. **SPECIAL SURVEYS (3:2:3)** Applications of surveying in hydrography, mining, construction, and subdivision planning; surveying registration law and professional ethics. Prerequisites: C.E. 812, 813.
817. **CARTOGRAPHIC TECHNIQUES (2:0:4)** Use of tools and equipment; projections used in art, advertising, government maps; relief methods; scribing techniques; map reproduction methods. Prerequisite: C.E. 809.
818. **ROUTE SURVEYING (2:1:3)** Field and office operations connected with highway and railroad location; mass diagram as related to economical distribution of earthwork. Prerequisite: C.E. 811. Concurrent: C.E. 812.
821. **CONCRETE TECHNOLOGY (3:2:3)** Characteristics of Portland cement concrete, physical properties of constituent materials, testing procedures, basics of reinforced concrete. Prerequisite: E.Mch. 813.
822. **SOIL MECHANICS (3:2:3)** Identification, classification, sampling, testing, handling, and consolidation of soils for highway construction. Prerequisites: E.Mch. 810, Phys. 151.
823. **HIGHWAY ORGANIZATION AND OPERATIONS (3:3:0)** Fundamentals of technology; plans and specifications; drainage, cost, traffic studies, and highway safety. Prerequisite: second-year standing in Highway Engineering Technology.
824. **ASPHALT TECHNOLOGY (3:2:3)** The use and testing of asphaltic material as adapted to highways.
825. **CONSTRUCTION ESTIMATING (3:3:0)** Job organization, estimating, cost control, construction methods and equipment for highway construction projects.
830. **SELECTED TOPICS IN CIVIL ENGINEERING TECHNOLOGY (3)** Individual or group work in civil engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.
840. **HYDROLOGY AND DRAINAGE (3:2:2)** Introduction to railway hydrology and drainage, soil studies, erosion control, and hydraulic design of culverts. Prerequisites: C.E. 809, 811.
841. **ECONOMIC RAILWAY LOCATION AND GEOMETRIC DESIGN (3:2:2)** Railway economics, history, design, and maintenance of vertical and horizontal curves; speed and super-elevation. Prerequisites: C.E. 812, 818; C.E. 816 or 840.
842. **RAILWAY TRACK MAINTENANCE AND OPERATION (3:1:5)** Specifications for safety standards for track, programming maintenance operations, track inspection. Prerequisite: C.E. 841. Concurrent: C.E. 843.
843. **RAILWAY TRACK STRUCTURE DESIGN AND CONSTRUCTION (3:1:5)** Design, layout, and construction of yards, turnouts, interlocking plants, and structures. Prerequisites: E.Mch. 813, C.E. 841. Concurrent: C.E. 842.
861. **FLUID FLOW (3:3:0)** Elementary theory of fluid flow: hydrostatics; flow through orifices, Venturi meters, and pipes; flow in open channels; theory of the centrifugal pump. Prerequisites: E.Mch. 810 or 811, Math. 802.
890. **LEGAL ASPECTS OF SURVEYING (2:2:0)** Legal principles affecting the determination of property boundaries; responsibilities of surveyors, attorneys, title companies, and the court. Prerequisite: C.E. 811.

## CLOTHING AND TEXTILES (CL TX)

835. **PREPARATION FOR PRACTICUM (1:1:0)** Analysis of employee responsibilities in an operating store situation; preparation for ten weeks of approved store experience. Prerequisite: third-term standing.
836. **PRACTICUM (2)** A minimum of ten weeks of practical store experience approved by the student's major adviser, including an acceptable written report. Prerequisites: Cl.Tx. 835, Mktg. 804, 805.

## COMMUNITY DEVELOPMENT (COM D)

7. (Adm.J. 7) **INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0)** An introduction to the study of community, community systems, and impact on the individual.

870. **COMMUNITY LEADERSHIP (2:2:1)** Principles and techniques of participation in voluntary community groups concerned with strengthening family and community life.

## COMPUTER SCIENCE (CMPSC)

1. **BASIC COMPUTER PROGRAMMING (1:0:2)** Fundamental characteristics of digital computers; organization and coding of problems for solution on digital computer. Prerequisite: 2 entrance units in mathematics.

101. **INTRODUCTION TO ALGORITHMIC PROCESSES (3:3:0)** Properties of algorithms, languages, and notations for describing algorithms; applications of a procedure-oriented language to problem solving. Students who have passed Cmp.Sc. 201, 203, 401, or 402 may not schedule this course. Prerequisite: 2 entrance units in mathematics.

102. **COMPUTER ORGANIZATION AND PROGRAMMING (3:3:0)** Computer components and organization, representation of numbers and characters, instruction codes, machine-language programming, assembly systems, input-output, subroutines, and macros. Prerequisite: Cmp.Sc. 101.

110. **STRUCTURED PROGRAMMING WITH NUMERICAL METHODS (3:3:0)** Introduction to the disciplined construction of algorithms; structured programming; examples from text processing and elementary numerical methods; error analysis; recursion. Prerequisite: Cmp.Sc. 101 or 201.

140. **INTRODUCTION TO DATA PROCESSING (3:3:0)** Applications of digital computers to problems in data processing with examples from accounting, record updating, inventory control, and report generation. Prerequisite: Cmp.Sc. 101.

144. **DATA ORGANIZATION AND ACCESSING TECHNIQUES (4:3:2)** Design characteristics of external storage devices; record organizations; accessing considerations for sequential, direct, relative, and indexed files; internal data structures. Prerequisites: Cmp.Sc. 102, 140.

154. **ADVANCED ASSEMBLER, I/O TECHNIQUES, AND JOB CONTROL LANGUAGES (3:3:1)** Macro-expansion; assembler-level I/O control; COBOL-assembler linkage conventions; advanced debugging techniques; assembler design; op-system features and JCL techniques. Students may not take both Cmp.Sc. 154 and 442 for credit. Prerequisite: Cmp.Sc. 144.

164. **CONTEMPORARY TRENDS IN COMPUTER PROGRAMMING (3:3:0)** State of the technology in design, code, test, and documentation techniques for information processing systems and large EDP production programs. Students may not take both Cmp.Sc. 164 and 444 for credit. Prerequisite: Cmp.Sc. 154.

803. **COMPUTER APPLICATIONS IN BUSINESS (3:3:0)** Characteristics of digital computers; the role of data processing in business; programming in a high-level language. Designed for two-year business administration students. Students who have passed Cmp.Sc. 101, 201, or 203 may not schedule this course.

804. **COMPUTER FUNDAMENTALS AND APPLICATIONS (2:2:0)** Types of computers and computer systems; storage and I/O devices; number systems and data representation; computer applications; typical EDP organization.

805. **COMPUTER APPLICATION PROBLEM (1-3)** The organization, flow charting, programming, debugging, and documentation of a major applied problem in a field of computer application. Prerequisite: fifth-term standing.

890. **SPECIAL TOPICS IN COMPUTER PROGRAMMING (1-3)** Application of any of several specific computer programming languages to problem solving. Prerequisite: Cmp.Sc. 101.

## **CULTURAL FOUNDATIONS OF EDUCATION (CF ED)**

115. EDUCATION IN AMERICAN SOCIETY (3:3:0) Introduction to the development of educational institutions, with emphasis on historical, philosophical, and sociological forces.

## **CURRICULUM AND INSTRUCTION (C I)**

211. INTRODUCTORY FIELD EXPERIENCE FOR TEACHER PREPARATION (2-3 per term, maximum of 6) Selected observation of schooling situations with small group and tutorial participation. Prerequisite: third-term standing. Concurrent: C.F.Ed. 115 and/or Ed.Psy. 14.

## **DAIRY SCIENCE (D SC)**

802. DAIRY PRODUCTION (2:1:2) The feeding, management, breeding, milking, disease control, and housing of dairy cattle; economic factors contributing toward the enterprise.

## **EARTH SCIENCE (EARTH)**

1. EARTH SCIENCE (3:3:0) Integrated approach to fundamental problems in the earth sciences. Fields of study include geological sciences, physical geography, and meteorology. No credit will be given for this course if a student takes Geosc. 20, Geog. 19, or Meteo. 300.

## **ECONOMICS (ECON)**

2. INTRODUCTORY MICROECONOMIC ANALYSIS AND POLICY (3:3:0) Methods of economic analysis and their use; economic aggregates; price determination; theory of the firm; distribution.

4. INTRODUCTORY MACROECONOMIC ANALYSIS AND POLICY (3:3:0) National income measurement; aggregate economic models; money and income; policy problems.

14. PRINCIPLES OF ECONOMICS (3:3:0) Analysis of the American economy, emphasizing the nature and interrelationships of such groups as consumers, business, governments, labor, and financial institutions. Students who have passed Econ. 2 or are registered in the College of Business Administration may not schedule this course.

315. LABOR ECONOMICS (3:3:0) An economic analysis of the labor market. Prerequisite: Econ. 2.

## **EDUCATIONAL PSYCHOLOGY (EDPSY)**

14. LEARNING AND INSTRUCTION (3:3:0) Psychology of human learning applied toward the achievement of educational goals; evaluation of learning outcomes.

## **ELECTRICAL ENGINEERING TECHNOLOGY (E E)**

800. APPLIED ELECTRICITY (2:1:3) Fundamentals of electric circuits; basic principles of electrical machinery and devices; electrical-mechanical analogies; beginning electronics. Prerequisite: Math. 801.

801. FUNDAMENTALS OF D.C. CIRCUITS (3:3:0) Fundamental theory of resistance, current, voltage. Direct-current circuit concepts developed from simplest series circuit through loop analysis; Thevenin's theorem. Prerequisite: Math. 801.

804. A.C. CIRCUITS (2:2:0) Application of network theorems, laws, and methods to alternating-current circuits; balanced and unbalanced polyphase systems. Prerequisite: E.E. 814.

807. A.C. AND ELECTRONICS LABORATORY (2:0:4) Laboratory study of alternating-current



circuits and semiconductors; assembly and tracing of electrical and electronic circuits. Must be taken with E.E. 804 and 810. Prerequisite: E.E. 818.

809. D.C. CIRCUITS LABORATORY (2:0:4) Introduction to electrical apparatus, including instruments, their interconnection into basic circuits, observation of circuit behavior, and report writing. Must be taken with E.E. 801.

810. FUNDAMENTALS OF SEMICONDUCTORS (3:3:0) Semiconductor physics and circuit theory including hybrid parameters; equivalent circuits; power amplifiers and frequency response of small signal amplifiers. Prerequisites: E.E. 814, Math. 803.

811. MICROPROCESSORS (3:2:2) Fundamentals of microprocessors, their application, and interfacing for data processing and control. Prerequisite: E.E. 814.

813. FUNDAMENTALS OF ELECTRICAL MACHINES (3:2:2) Direct-current machinery principles and applications; introduction to machines and basic concepts of laboratory methods related to machinery studies. Prerequisites: E.E. 814, 818.

814. ELECTRICAL CIRCUITS (4:4:0) Direct-current circuit analysis; introduction to basic magnetism and magnetic circuits; single-phase circuit fundamentals. Prerequisites: E.E. 801, Math. 802.

815. A.C. MACHINERY AND CONTROL (3:3:0) Alternating-current machinery principles and applications; survey of alternating- and direct-current machinery control methods. Prerequisites: E.E. 804, 813.

816. LINEAR ELECTRONIC CIRCUITS (3:3:0) Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, vacuum tubes, and operational amplifiers. Prerequisite: E.E. 817.

817. ADVANCED ELECTRONICS (4:4:0) Fundamentals and application of pulse and digital circuits and electronic devices, such as unijunction transistors, photo devices, and zener diodes. Prerequisite: E.E. 810.

818. ELECTRICAL CIRCUITS LABORATORY (1:0:2) Laboratory study of direct-current networks and alternating-current circuits. Must be taken with E.E. 814. Prerequisite: E.E. 809.

819. A.C. MACHINERY LABORATORY (1:0:2) Alternators, induction generators, single- and polyphase motors, synchro units; transformers, saturable reactors, and protective devices. Must be taken with E.E. 815. Prerequisite: E.E. 807.

820. ADVANCED ELECTRONICS LABORATORY (1:0:2) Laboratory study of solid state pulse, digital, industrial, and motor control circuits. Prerequisite: E.E. 807.

821. LINEAR ELECTRONICS LABORATORY (1:0:2) Laboratory study of transistors; study of differential and operational amplifiers. Emphasis is placed on circuit design. Must be taken with E.E. 816. Prerequisite: E.E. 820.

830. SELECTED TOPICS IN ELECTRICAL ENGINEERING TECHNOLOGY (3) Individual or group work in electrical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING (ENGR)

2. ENGINEERING ORIENTATION (1:0:2) Introduction to efficient methods for analyzing and solving engineering problems.

5. EXPERIMENTAL METHODS FOR ENGINEERS (1:0:2) Introduction to experimental methods used in engineering. Applications of basic experimental and computational concepts through student involvement in laboratory experiments.

801. INTRODUCTION TO ENGINEERING (0:1:0) Introduction to all functions and branches of engineering through general lectures.



## ENGINEERING GRAPHICS (E G)

1. **ENGINEERING DRAWING (2:0:5)** Technical skills and drafting room practices; fundamentals of theoretical graphics; orthogonal, oblique, and perspective projections; working and schematic drawings.
3. **ARCHITECTURAL GRAPHICS (2:0:6)** Principles of architectural drawing; spatial relationships of points, lines, planes, and solids with architectural applications; shadows, perspective.
10. **INTRODUCTORY ENGINEERING GRAPHICS (1:0:3)** Multiview projections, pictorial drawings, dimensioning, engineering standards, and working drawings.
11. **ENGINEERING DESIGN GRAPHICS (1:0:3)** Introduction to creative design, space analysis, graphs, graphical mathematics, vector analysis, and design implementation. Prerequisite: E.G. 10 or 21.
12. **SPATIAL ANALYSIS (2:0:5)** Spatial relations of points, lines, and solids, with engineering applications. Prerequisite: 1 credit of introductory graphics.
50. **ENGINEERING METHODS AND GRAPHICAL COMMUNICATION (3:1:5)** Introduction to engineering through experimental methods of measurement and graphical expressions; multiviews, pictorials, dimensioning, space analysis, graphical mathematics, laboratory experience.
800. **DRAWING ROOM STANDARDS AND PRACTICES (2:0:6)** Interpretation of various types of engineering drawings, including dimensional systems, symbols, and American standard drafting room practices. Prerequisite: E.G. 10.
803. **ADVANCED ENGINEERING DRAWING (3:1:5)** Application of principles of engineering drawing, including auxiliary views in the layout of detail, assembly, and working drawings. Prerequisite: E.G. 1.
830. **SELECTED TOPICS IN ENGINEERING GRAPHICS (1-3)** Individual or group work in engineering graphics offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING MECHANICS (E MCH)

11. **STATICS (3:3:0)** Equilibrium of coplanar force systems; analysis of frames and trusses; noncoplanar force systems; friction; centroids and moments of inertia. Prerequisite or concurrent: Math. 162.
12. **DYNAMICS (3:3:0)** Motion of a particle; relative motion; kinetics of translation, rotation, and plane motion; work-energy; impulse-momentum. Prerequisites: E.Mch. 11, Math. 250.
13. **STRENGTH OF MATERIALS (3:3:0)** Axial stress and strain; torsion; stresses in beams; elastic curves and deflections of beams; combined stress; columns. Prerequisite: E.Mch. 11.
215. **MECHANICAL RESPONSE OF ENGINEERING MATERIALS (2:2:0)** Mechanical response measures and design theories for engineering materials; elastic and plastic response as affected by stress, strain, time, temperature. Prerequisite: E.Mch. 13.
810. **BASIC MECHANICS (2:2:0)** Forces; moments; resultants; equilibrium of force systems; introduction to dynamics. Prerequisite: Math. 801.
811. **ELEMENTARY MECHANICS (3:3:0)** Forces; moments; resultants; equilibrium of force systems; friction; centroids and moment of inertia of areas; dynamics of particles. Prerequisite: Math. 801.
812. **INTRODUCTION TO DYNAMICS (3:2:2)** Absolute and relative motion related to particles and simple linkages. Force-mass-acceleration, work-energy, and impulse-momentum solution techniques. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Math. 803.
813. **STRENGTH AND PROPERTIES OF MATERIALS (3:3:0)** Axial stress and strain; shear; riveted and welded connections; torsion; beam stresses and deflections; combined axial and bending stresses; columns, ductility, resilience, and toughness. Prerequisite: E.Mch. 811.

## ENGLISH (ENGL)

\*4. **BASIC WRITING SKILLS (1-3)** Intensive practice in writing sentences and paragraphs and instruction in grammar, usage, and punctuation. Designed for students with deficient preparation. This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.

10. **COMPOSITION AND RHETORIC I (3:3:0)** Organizing and writing clear expository essays. Prerequisite: Engl. 4 or satisfactory performance on English Proficiency Examination.

20. **COMPOSITION AND RHETORIC II (3:3:0)** Building and presenting cogent written arguments, with attention to style. Prerequisite: Engl. 10.

30. **HONORS FRESHMAN COMPOSITION (3:3:0)** Writing practice for specially qualified and screened students. Students who are exempt from Engl. 10 and have passed a special writing test will qualify for this course.

101. **INTRODUCTION TO LITERATURE (3:3:0)** Selected readings in types of literature: short story, novel, essay, poetry, and drama. Not recommended for majors. Prerequisite or concurrent: Engl. 20 or 30.

102. **GREAT BOOKS OF BRITISH LITERATURE (3:3:0)** Introduction to British literature through the reading and discussion of significant works. Intended for nonmajors.

103. **GREAT BOOKS OF AMERICAN LITERATURE (3:3:0)** Introduction to American literature through the reading and discussion of significant works. Intended for nonmajors.

104. **THE ENGLISH BIBLE (3:3:0)** History of the English Bible and its antecedents; study of the Bible as a cultural and literary document. Prerequisite or concurrent: Eng. 20 or 30.

120. **SURVEY OF MEDIEVAL ENGLISH LITERATURE (3:3:0)** Background and development of medieval English literature. Selected works from *Beowulf* to Malory read in modernized versions.

121. **MASTERPIECES OF ENGLISH LITERATURE I (3:3:0)** Discussions of major poetry, prose, and drama from Chaucer through Fielding. Such writers as Shakespeare, Donne, Milton, and Pope.

122. **MASTERPIECES OF ENGLISH LITERATURE II (3:3:0)** Discussions of major works from the beginnings of romanticism to 1900. Such writers as Blake, Wordsworth, Keats, Browning, Dickens, Hardy.

123. **MASTERPIECES OF ENGLISH LITERATURE III (3:3:0)** Discussions of major works of modern fiction, poetry, and drama. Such writers as Conrad, Lawrence, Joyce, Yeats, Shaw.

129. **SHAKESPEARE (3:3:0)** A selection of the major plays studied to determine the sources of their permanent appeal. Not recommended for English majors. Prerequisite or concurrent: Engl. 20 or 30.

131. **AMERICAN LITERATURE TO THE CIVIL WAR (3:3:0)** Puritan and colonial writers including Franklin, Poe, Emerson, Thoreau, Hawthorne, and Melville.

132. **AMERICAN LITERATURE FROM THE CIVIL WAR TO WORLD WAR I (3:3:0)** The rise of realism and new voices in poetry. Whitman, Dickinson, Twain, Stephen Crane, Henry Adams, Henry James, and others. Prerequisite or concurrent: Engl. 20 or 30.

133. **MODERN AMERICAN LITERATURE TO WORLD WAR II (3:3:0)** Eliot, Frost, Faulkner, Fitzgerald, Hemingway, O'Neill, and other writers representative of the years between the world wars. Prerequisite or concurrent: Engl. 20 or 30.

139. **BLACK AMERICAN LITERATURE (3:3:0)** Fiction, poetry, and drama, including such writers as Baldwin, Douglass, Ellison, Morrison, and Wright.

140. **CONTEMPORARY LITERATURE (3:3:0)** Representative fiction, essays, poetry, and drama by such writers as Barth, Bellow, Lowell, Mailer, Beckett, Durrell, and Pinter. Prerequisite or concurrent: Engl. 20 or 30.

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\*Although open to all students, it is especially designed to precede or supplement Engl. 10. Enrollment *either* on the basis of test scores, at the beginning of the term (3 credits), *or* from the first through sixth weeks of the term (1 credit).

## FINANCE

165. **THE DEVELOPMENT OF THE ENGLISH NOVEL (3:3:0)** Origins and backgrounds of the English novel; selected works from Defoe to the present. Prerequisite or concurrent: Engl. 20 or 30.
167. **POETRY (3:3:0)** Introduction to the appreciation and analysis of English and American poetry.
168. **DRAMA (3:3:0)** Introduction to the range of dramatic expression in selected plays, primarily English and American.
184. (C.Lit. 184) **THE SHORT STORY (3:3:0)** Lectures, discussion, readings in translation, with emphasis on major writers of the classical, medieval, Renaissance, and modern periods.
185. (C.Lit. 185) **THE MODERN EUROPEAN NOVEL (3:3:0)** Development of the European novel in the last hundred years; lectures, discussion, readings in translation, with emphasis on major novelists.
189. (C.Lit. 189) **FOUNDATIONS OF MODERN DRAMA (3:3:0)** Playwrights who set the world's stage for twentieth-century drama: Ibsen, Shaw, Chekhov, and Strindberg.
191. **SCIENCE FICTION (3:3:0)** Science fiction as the literature of technological innovation and social change—its development, themes, and problems.
192. **THE LITERATURE OF FANTASY (3:3:0)** Major realms of fantasy in English and American literature: daydream and nightmare, the pastoral, dystopia, utopia, apocalypse, and the heroic.
194. **WOMEN WRITERS (3:3:0)** Short stories, novels, poetry, drama, and essays by major English and American women writers since 1870.
196. (Folk. 196) **ESSENTIALS OF ANGLO-AMERICAN FOLKLORE (3:3:0)** A basic introduction to verbal and nonverbal folklore, stressing the basic procedures of collection, classification, and analysis. Prerequisite or concurrent: Engl. 20 or 30.
197. **AMERICAN FOLK SONG IN THE ENGLISH (3:3:0)** British songs in America; native repertoires, white and Negro; folk ballad; and musical development.
297. **SPECIAL TOPICS (1-6)**
826. **REPORT WRITING (3:3:0)** Interpretation of statistical data and writing of technical reports. Prerequisite: Engl. 4 or 10.

## FINANCE (FIN)

108. **PERSONAL FINANCE (3:3:0)** Personal management of budgets, bank accounts, loans, credit buying, insurance, real estate and security buying. May not be scheduled by College of Business Administration students. Prerequisite: fourth-term standing.
210. **COMMERCIAL BANK MANAGEMENT (3:3:0)** Fundamental principles underlying management of a commercial bank; capital funds; asset and liability management; value maximization; legal and operational constraints. Prerequisite: Fin. 105.
807. **BANKING AND CORPORATE FINANCE (3:3:0)**

## FOOD SERVICE AND HOUSING ADMINISTRATION (FS HA)

102. **INTRODUCTION TO FOOD SERVICE AND HOUSING ADMINISTRATION (3:3:0)** Professional duties of management personnel in large food and housing operations, their working conditions, and organizations which they serve.
103. **INTRODUCTION TO HEALTH FACILITIES FOOD SERVICE ADMINISTRATION (3:3:0)** Professional functions of the hospital food service system, relationships with the nutrition component of food service system, and organization served.
225. **FOOD AND LABOR MANAGEMENT AND CONTROL (3:3:0)** Techniques for analyzing and controlling costs in hospitality organizations. Prerequisite: 3 credits in accounting.
295. **IN-SERVICE TRAINING (1:1:0)** Eight weeks or 300 hours of practical experience in operations of the type in which the student is majoring.



320. HOSPITALITY INDUSTRY EQUIPMENT AND UTILITIES (3:3:0) Principles governing the purchase, use, and operation of heating, plumbing, refrigeration, air conditioning, and other equipment and utilities.
321. HOSPITALITY INDUSTRY MAINTENANCE (2:2:0) Maintenance management in hospitality operations.

## FORESTRY (FOR)

203. FIELD DENDROLOGY (2:0:6) Identification of trees and shrubs by leaf, fruit, bud, twig, and bark.
220. FOREST ECOSYSTEM PROTECTION (3:3:0) Basic biological, physical, sociological, and management concepts involved in protecting the forest ecosystem from wild fire, insects, and disease.
221. FOREST FIRE TECHNOLOGY (1:0:3) Technological aspects of controlling and using fire in the forest environment. Prerequisite: For. 220.
240. SILVICULTURAL PRACTICES (3:2:3) Principles and techniques of forest establishment, culture, regeneration, and harvesting. Prerequisite: For. 203.
241. AERIAL PHOTO INTERPRETATION (4:2:6) Aerial photo interpretation techniques applied to land management inventories, mapping, road location, and procurement. Prerequisites: For. 203; 804 and 806, or 366.
242. ELEMENTS OF PROJECT SUPERVISION IN FORESTRY (3:3:0) Supervisory techniques developed through an understanding of the behavioral sciences applied to field forestry personnel management.
802. DENDROLOGY (2:0:6) Taxonomy of woody plants; their field identification; the geographic distribution of the important forest trees of the United States.
803. DENDROLOGY (2:0:6) Continuation of For. 802 with emphasis on the taxonomy of the angiosperms. Prerequisite: For. 802.
804. FOREST MENSURATION (3:2:3) Measurement of forests and forest products.
806. FOREST INVENTORIES (3:2:3) Application of land surveying and sampling techniques, including statistical analysis, for the determination of timber volume and growth.
807. FOREST RECREATION (3:2:3) Development, construction, and management of forest recreation areas and facilities. Prerequisite: For. 815.
808. FOREST PROTECTION (3:2:3) Forest fire prevention, detection, behavior, and suppression; fire plans and statistics; insect and disease control.
809. FOREST VALUATION (3:2:3) Determination of forest values through a consideration of markets, logging and milling costs, stumpage appraisals, and other forest values. Prerequisite: For. 806.
810. FOREST IMPROVEMENTS (3:2:3) Use of materials and equipment in developing, operating, and maintaining the forest property.
814. FORESTRY LEADERSHIP PRACTICUM (1:0:3) Leadership techniques applied to standard forestry field operations. Prerequisite or concurrent: For. 812.
815. FOREST SURVEYING I (3:2:3) Basic plane surveying techniques as applied to forestry practices. Prerequisite or concurrent: Math. 801.
816. FOREST SURVEYING II (3:2:3) Standard mapping techniques as applied to field forestry situations. Prerequisite: For. 815.
817. URBAN FORESTRY (3:2:3) The application of land treatment techniques and forestry practices to urban environments. Prerequisites: For. 802, 807.
818. INDIVIDUAL STUDIES (1-3 per term) Individual study of forest technology.
820. ADVANCED FOREST MEASUREMENTS (1) Application of point and 3P sampling methods as a means of developing the data base for integrated forest management planning. Prerequisites: For. 809, 816, 826.



## FRENCH

821. **FIELD STUDIES IN ECOLOGY (1)** Field studies in ecological problems, challenges, and impacts related to normal forest practices in general resource management. Prerequisites: For. 809, 816, 826.
822. **FOREST MANAGEMENT SYSTEMS (1)** Field projects in the integrated application of silvicultural, mensurational, and financial principles in forest management planning. Prerequisites: For. 809, 816, 826.
824. **INTRODUCTION TO HARVESTING (1:0:3)** Practical instruction in the use and maintenance of hand tools and small power tools used in logging operations.
825. **HARVESTING TECHNIQUES (1:0:3)** Practical instruction in the operation of heavy equipment used in timber harvesting. Prerequisite: For. 824.
826. **REFORESTATION AND INTERMEDIATE OPERATIONS (1:0:3)** Field practicum in planting, pruning, thinning forest stands. Prerequisite: For. 825.
827. **FIELD STUDY PREPARATION (1)** Developing practices, procedures, and materials for conducting integrative field studies. Prerequisites: For. 241, 802, 809, 815.

## FRENCH (FR)

1. **ELEMENTARY FRENCH (4:3:2)** Grammar, with reading and writing of simple French; oral and aural work stressed.
2. **ELEMENTARY FRENCH (4:3:2)** Grammar and reading continued; oral and aural phases progressively increased. Prerequisite: Fr. 1.
3. **INTERMEDIATE FRENCH (4:3:2)** Grammar, reading, composition, oral and aural exercises. Prerequisite: Fr. 2.
140. **FRENCH NOVEL IN ENGLISH TRANSLATION (1-6)** Readings of selected French masterpieces in translation; discussion of recurring themes in several literary periods.

## GEOGRAPHY (GEOG)

20. **MAN'S WORLD: AN INTRODUCTION TO MODERN HUMAN GEOGRAPHY (3:3:0)** Spatial perspective on human societies in a modernizing world; regional examples; use of space and environmental resources; elements of geographic planning.
24. **ELEMENTS OF CULTURAL GEOGRAPHY (3:3:0)** Locational analysis of changes in non-Western cultures. Problems of plural societies, economic development, population growth, and settlement.
26. **HUMAN GEOGRAPHY (3:3:0)** Introduction to concepts, principles, and theories of spatial organization.

## GEOSCIENCES (GEOSC)

- \*1. **PHYSICAL GEOLOGY (3:2:3)** Earth processes and their effects on the materials, structure, and morphology of the earth's crust. Practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps.
- \*20. **OUR EARTH (3:2:2)** Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation.
- \*21. **EARTH HISTORY (3:2:2)** Evolution of the earth; changing patterns of mountains, lowlands, and seas; development of living organisms. Practicum includes field trips, studies of geologic maps, geologic problems, fossils.

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\*This course includes from one to several field trips for which an additional charge will be made to cover transportation.

## GERMAN (GER)

1. BASIC GERMAN (3:3:0) Listening, speaking, reading, writing; introduction to basic structures and vocabulary through dialogs and literary-cultural readings.
2. BASIC GERMAN (3:3:0) Listening, speaking, reading, writing; further study of basic structures and vocabulary through dialogs and literary-cultural readings. Prerequisite: Ger. 1.
3. INTERMEDIATE GERMAN (3:3:0) Continued skill development; readings consisting of short literary and journalistic writings; increased attention to German cultural context. Prerequisite: Ger. 2 or 12.
4. INTERMEDIATE GERMAN (3:3:0) Continued skill development; readings consisting of short stories, short plays, poems, articles; German in its cultural context. Prerequisite: Ger. 3.
100. GERMAN CULTURE AND CIVILIZATION (3:3:0) Life of the German people from the early Middle Ages to modern times; their literature and arts, music, science, and philosophy.

## HEALTH EDUCATION (HL ED)

57. CONSUMER HEALTH (1:1:0) Essentials for determining credibility of claims for particular health services and products in a consumer's perspective.
303. EMERGENCY CARE (2:1:2) Competencies leading to American Red Cross Advanced First Aid and Emergency Care and American Heart Association Cardiopulmonary Resuscitation certification.

## HISTORY (HIST)

12. HISTORY OF PENNSYLVANIA (3:3:0) Chronological and topical survey emphasizing immigration of diverse ethnic groups, religious, political, economic, and social developments, including industrialization and urbanization.
16. INTRODUCTION TO THE HISTORY OF THE ANCIENT WORLD (3:3:0) Civilization of the ancient Mediterranean world from primitive man to the decline of the Roman Empire.
17. INTRODUCTION TO THE HISTORY OF THE MIDDLE AGES (3:3:0) Rise and development of the civilization of medieval Europe from the decline of Rome to 1500.
18. MODERN EUROPE 1500-1815 (3:3:0) Renaissance and Reformation; rise of national states; overseas expansion; development of science; decline of feudalism; French Revolution and Napoleonic era.
19. MODERN EUROPE, 1815 TO THE PRESENT (3:3:0) Growth of European democracy; scientific progress; Italian and German unification; Industrial Revolution; imperialism; the world wars; search for security and stability; Fascism and Communism.
20. HISTORY OF THE UNITED STATES TO 1865 (3:3:0) Introductory survey including the colonial background and emphasizing the impact of nationalism and sectionalism on American political, economic, social, and cultural development.
21. HISTORY OF THE UNITED STATES SINCE 1865 (3:3:0) Integrated survey emphasizing the emergence of a dominantly urban-industrial society; expanded role of government; America's increasing involvement in world affairs.
22. LATIN-AMERICAN HISTORY TO 1820 (3:3:0) Conquest of New World, development of colonial institutions, impact on native cultures, and origins of independence movements.
23. LATIN-AMERICAN HISTORY SINCE 1820 (3:3:0) Origin, political growth, international relations, and economic status of the Latin-American republics with emphasis upon present-day conditions.
30. ANCIENT GREECE (3:3:0) Greek world from the earliest Aegean cultures to the death of Alexander the Great and the beginnings of Hellenistic civilization.
112. COLONIAL PENNSYLVANIA (3:3:0) Development of the colony of Pennsylvania through the War for American Independence, covering immigration, economics, politics, religion, and society.

## HOTEL AND FOOD SERVICE

141. **MEDIEVAL AND MODERN RUSSIA (3:3:0)** Introductory survey including political, social, economic, and cultural development of Kievan, Muscovite, and Imperial Russia.
142. **HISTORY OF COMMUNISM (3:3:0)** Marxism; Leninism and evolution of the Soviet Union; formation and development of the communist bloc; impact of Chinese Communism.
143. **HISTORY OF FASCISM AND NAZISM (3:3:0)** The study of right-wing totalitarianism in the twentieth century with special emphasis on Fascist Italy and Nazi Germany.
151. **TECHNOLOGY AND SOCIETY IN AMERICAN HISTORY (3:3:0)** Development of technology in America from colonial times; its reception and its influence on social, economic, and political life.
152. **AFRO-AMERICAN HISTORY (3:3:0)** African roots; colonial and revolutionary experiences; slavery and abolitionism; civil war and reconstruction; accommodation and protest; the new militancy.
154. **HISTORY OF WELFARE IN AMERICA (3:3:0)** History of the care of dependent people (including children, the aged, mentally ill, unemployed) from colonial times to the present.
155. **AMERICAN BUSINESS HISTORY (3:3:0)** The development of business from the planting of the colonies, through the stages of industrialization, to the present.
156. (L.S. 156) **HISTORY OF THE AMERICAN WORKER (3:3:0)** A study of the American worker from the preindustrial era to the present.
158. **HISTORY OF AMERICAN IMMIGRATION (3:3:0)** The waves of migration to America and an analysis of the resulting minority groups, their reception, assimilation, and persisting identity.
171. **HISTORY OF MODERN SOUTHEAST ASIA (3:3:0)** Sociopolitical survey of Southeast Asian history emphasizing the modern period. Origins of traditional civilization, colonialism and nationalism, problems of independence.
174. **THE HISTORY OF TRADITIONAL EAST ASIA (3:3:0)** Comparative cultural, institutional, and social history of traditional China and Japan to their contact with the industrialized West.
175. **THE HISTORY OF MODERN EAST ASIA (3:3:0)** Comparative survey of the internal developments and external relations of China and Japan since their contact with the industrialized West.
191. **EMERGING AFRICA (3:3:0)** Indigenous African societies; impact of Rome, Islam, and Europe; slave trade; colonialism; nationalism; problems since independence.
195. **HISTORY OF CANADA (3:3:0)** An integrated survey from French colonial beginnings to modern Dominion status, with special emphasis on relations with the United States.

## HOTEL AND FOOD SERVICE (H F S)

802. **SANITATION AND HOUSEKEEPING (3:3:0)** Practical applications of sanitation principles to food service and housing delivery systems; organization and work methods in the housekeeping function.
804. **HOTEL AND FOOD SERVICE MERCHANDISING (3:3:0)** Merchandising as a system distributing benefits, collecting costs, concerned with motivating consumers. Topics include promotion, menu planning, and research methods.
805. **TRAINING AND SUPERVISION (3:3:0)** Methods and techniques of training and supervising food service and housing employees for overall efficiency of operation.
810. **FOODS EXPERIENCE (4:3:2)** Theory, observation, and practice in food services; emphasis on planning, preparation, and service in commercial food operations.
850. **FOOD SERVICE DELIVERY SYSTEMS (4)** Physical characteristics of principal food product groups considered. Topics include purchasing problems, preparation techniques, quality and cost control. Prerequisites: Acctg. 101, F.S.H.A. 225.
860. **FOOD SERVICE SUPERVISION (4)** The principal food service administrative routines are considered from the point of view of the supervisor and middle manager. Prerequisite: H.F.S. 850.



870. **FOOD AND BEVERAGE ADMINISTRATION (4)** Components of food service systems are identified and studied as separate problems and as a total system. Prerequisite: H.F.S. 860.

875. **HOSPITAL FOOD OPERATING SYSTEMS (4)** Consideration of hospital food service system as determined by patient needs, physical plant, operating policies, cost constraints, and quality standards. Prerequisite: H.F.S. 860.

## **HUMAN DEVELOPMENT (H DEV)**

100. **INTRODUCTION TO HUMAN DEVELOPMENT (1:1:0)** Human development as a process of man-environment transactions, and the relationships of various fields to the study of that process.

200. **EMPIRICAL INQUIRY IN HUMAN DEVELOPMENT (3:3:0)** Introduction to methods and philosophy of empirical inquiry applied to problems of human development.

395. **FIELD PROJECTS (1-12)** Independent study and research in a human service program; written and oral summary of rationale, procedures, findings.

## **HUMANITIES (HUMAN)**

1. **VALUES OF THE WESTERN CULTURAL HERITAGE (3:3:0)** Fundamental values of human experience as expressed in outstanding philosophical and literary works.

2. **SHAPING OF THE MODERN MIND (3:3:0)** Relevance to the present age of influential literary and philosophical texts illustrative of the principal epochs of Western civilization.

21. **IDEAS AND ARTS (3:3:0)** Interaction of intellectual and aesthetic values from the Renaissance to the present.

50. **THE LITERATURE AND LORE OF MINING (3:3:0)** Experience and values of mining tradition: survey of the literature and lore, including fields.

101. **MODERN SCIENCE AND HUMAN VALUES (3:3:0)** Relationships of science to the aspirations, values, and arts of man.

800. **SOURCES OF MORALITY (3:3:0)** The uses of law and love in man's endeavor to perfect himself.

801. **SCIENCE, TECHNOLOGY, AND HUMAN VALUES (3:3:0)** The effect of science and technology upon man's being, thought, and action.

## **INDIVIDUAL AND FAMILY STUDIES (I F S)**

16. **EFFECTIVE INTERPERSONAL SKILLS (1:1:0)** Training in interaction skills required for the development and maintenance of satisfying interpersonal relationships.

129. **INTRODUCTION TO INDIVIDUAL AND FAMILY DEVELOPMENT (3:3:0)** Introduction to psychosocial and family development at all stages of the individual and family life cycle.

319. **FAMILY FINANCIAL MANAGEMENT (3:3:0)** How families plan their finances and factors that determine their decisions.

329. **INFANCY AND EARLY CHILDHOOD (3:3:0)** Theories, research findings, and methods in social/behavioral/biological sciences related to developmental processes and intervention during infancy/early childhood. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.

## **INDUSTRIAL ENGINEERING (I E)**

315. **INDUSTRIAL ORGANIZATION AND ADMINISTRATION (3:3:0)** Fundamental principles of organization leading to intelligent appreciation of the simpler problems of factory organization and operation. Students registered in industrial engineering may not schedule this course.



## INDUSTRIAL ENGINEERING TECHNOLOGY (I E)

804. **NOMOGRAPHY (1:0:2)** The preparation of charts and monograms used in the analysis and presentation of engineering and production problems. Prerequisite: Math. 802.

805. **ECONOMICS OF INDUSTRY (2:2:0)** Internal economics of industrial enterprise, cost factors, and methods of comparing alternate proposals.

807. **STATISTICAL QUALITY CONTROL (3:3:0)** The application of this technique to the control of the manufacturing processes and to inspection. Prerequisite: Math. 802.

808. **PLANT LAYOUT (2:0:6)** Arrangement and layout of equipment and processes in an industrial plant for the most economical production. Prerequisites: E.G. 10, I.E. 816.

809. **INSPECTION AND QUALITY CONTROL (3:2:2)** Inspection methods and procedures and their applications to control and acceptance sampling based on statistical methods. Prerequisite: Math. 802.

810. **PRODUCTION LAYOUT AND CONTROL (3:1:6)** Arrangement of equipment and processes in industry and subsequent control of production through stores, routing, scheduling, dispatching, and follow-up techniques. Prerequisite: I.E. 816.

811. **MANUFACTURING MATERIALS AND PROCESSES (3:2:3)** Mechanical properties of materials; primary processing methods used in manufacturing, emphasizing ferrous metals, their relationship to other metals and nonmetals.

812. **MANUFACTURING PROCESSES (3:1:6)** Technology related to metal removal, dimensional inspection, metal joining, hot and cold forming heat treating, metal casting, properties of materials. Prerequisite: I.E. 811.

815. **PRODUCTION DESIGN (3:1:6)** The planning, designing, and specifying of both standard and special tools required for the production of manufactured goods. Prerequisites: E.G. 803, I.E. 812.

816. **METHODS ANALYSIS AND MOTION STUDY (3:1:6)** Construction and use of process charts, primary approach to operation analysis, and principles of motion economy. Prerequisite: I.E. 812.

817. **TIME STUDY AND WAGE PAYMENT (3:1:6)** Fundamentals of time study with instruction in time study practices; application of time studies to incentive wage payment systems. Prerequisite: I.E. 816.

## INSURANCE (INS)

800. **INSURANCE PRINCIPLES (3:3:0)** Introductory survey of all lines of insurance for handling business and personal risks.

810. **LIFE INSURANCE (3:3:0)** The life insurance contracts as methods of treating the problems of premature death and superannuation. Prerequisite: Ins. 800.

820. **PROPERTY AND CASUALTY INSURANCE (3:3:0)** Fundamental principles of property and casualty insurance. Prerequisite: Ins. 800.

830. **INSURANCE PRACTICUM (3:3:0)** Practical introduction to insurer operations in company and agency offices. Prerequisite: Ins. 820.

## INTERNATIONAL BUSINESS (I B)

862. **INTERNATIONAL BUSINESS (3:3:0)**

## INTERNATIONAL UNDERSTANDING (INT U)

200. **INTERNATIONAL UNDERSTANDING AND WORLD AFFAIRS (3:3:0)** Interdisciplinary consideration of international problems, conflict and accommodation; impact of various cultures and ideologies on world affairs and foreign policy. Credit will not be given for both this course and Pl.Sc. 14. Prerequisite: fourth-term standing.

## JOURNALISM (JOURN)

200. THE MASS MEDIA AND SOCIETY (3:3:0) Mass communications in the United States; organization, role, content, and effects of newspapers, magazines, television, radio, books, and films. Not intended for students in the School of Journalism.

800. HISTORY AND SURVEY OF MASS COMMUNICATIONS (3:3:0) History and role of mass media and advertising in society; nature of newspaper, magazine, broadcasting, book, and motion picture industries.

801. BEGINNING NEWS WRITING (3:1:4) Techniques of news writing with emphasis on organizing the story. Detailed critiques and class discussion of student writing. Prerequisites: Engl. 4, Journ. 800, ability to type.

802. BEGINNING REPORTING (3:1:4) The techniques of gathering news; problems of taste, ethics, and legality in reporting the news; community reporting assignments. Prerequisite: Journ. 801.

803. FUNDAMENTALS OF EDITING (3:1:4) Techniques of editing material for publication; printing processes; copyreading; headline writing; typography; picture editing; layout; legal and ethical considerations. Prerequisite: Journ. 802.

804. REPORTING THE COMMUNITY (3:0:9) Practicum in newspaper reporting, editing, and production. Prerequisite: Journ. 803.

811. ADVERTISING COPYWRITING (3:1:4) Techniques of writing advertising headlines and copy, with emphasis on spelling, grammar, and word choice. Detailed critiques of student writing. Prerequisite: Journ. 800.

812. ADVERTISING LAYOUT (3:1:4) Print advertisement design and production, including typography, plate making, mat services, shop procedures, etc.; detailed critiques of layouts; field trips. Prerequisite: Journ. 800.

813. ADVERTISING MEDIA AND CAMPAIGNS (3:1:4) Media selection and coordination, creative strategy, and campaign execution. Each student plans and produces a complete advertising campaign. Prerequisites: Journ. 811, 812.

814. NEWSPAPER ADVERTISING (3:0:9) Management of the newspaper advertising department, advertising sales promotion, preparing the sales presentation, dealing with the advertiser, advertising page make-up. Prerequisite: Journ. 813.

820. NEWSPAPER MANAGEMENT (3:3:0) Managing and publishing newspapers in the United States; problems of law, finance, personnel, promotion, technological change, and community service. Prerequisite: Journ. 803 or 813.

## LABOR STUDIES (L S)

100. INDUSTRIAL RELATIONS (3:3:0) Introductory analysis of the employment relationship and of the interrelated interests of managements, workers, unions, and the public.

102. STRUCTURE AND FUNCTION OF UNIONS (3:3:0) A study of the internal structure, goals, and impact on society of unions.

103. LABOR LEGISLATION (3:3:0) A study of legislation regulating the functioning of trade unions.

104. THE PRACTICE OF COLLECTIVE BARGAINING (3:3:0) A study of the process of collective bargaining, the issues in collective bargaining, and bargaining relationships.

156. (Hist. 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.

296. INDEPENDENT STUDIES (1-12)

## LIBRARY STUDIES (L ST)

1. INTRODUCTION TO THE USE OF THE LIBRARY (3:2:2) Use of the card catalog, periodical indexes, and reference books; test problems and bibliographies.

## MANAGEMENT (MGMT)

800. PRINCIPLES OF MANAGEMENT (3:3:0)

801. PRINCIPLES OF MANAGEMENT (3:3:0) Prerequisite: Mgmt. 800.

802. SUPERVISORY MANAGEMENT (3:3:0) Preparation for supervisory positions in formal organizations. Emphasis placed on the motivational aspects of the supervisor's job. Prerequisite: Mgmt. 800.

## MAN-ENVIRONMENT RELATIONS (M E R)

213. PRINCIPLES OF CLOTHING I (2:2:0) Analysis of aesthetic, functional, and socio-psychological factors related to clothing needs and usage.

214. PRINCIPLES OF CLOTHING II (2:2:0) Current cultural influences on the designer, design media, and construction processes in the mass production technology of clothing. Prerequisite: M.E.R. 213.

215. CLOTHING CONSTRUCTION (1-4) Experimentation with construction techniques for selected fabrics and design requirements. Prerequisite or concurrent: M.E.R. 213, or consent of instructor.

301. ELEMENTARY TEXTILES (3:2:2) Recognition, use, and care of textiles related to characteristics of fibers, yarns, fabric construction, and finishes. Prerequisite: Chem. 11 or Ph.Sc. 8.

## MARKETING (MKTG)

800. PRINCIPLES OF MARKETING (3:3:0)

801. PRINCIPLES OF MARKETING (3:3:0) Prerequisite: Mktg. 800.

802. PROMOTION MANAGEMENT (3:3:0) The application and management of various forms of persuasive communication with potential customers; personal selling, sales management, advertising, sales promotion. Prerequisite: Mktg. 801.

803. PRINCIPLES OF RETAILING (3:3:0) Introduction to the management of retailing organizations, with emphasis on decision making. Not open to retailing majors.

804. PRINCIPLES OF RETAILING SALESMANSHIP (3:3:0) Principles of selling applied to the retail level of trade; practical application of these principles in various sales situations.

805. RETAILING I (3:3:0) An analysis of the management and merchandising policies of various types of retailing institutions.

806. RETAILING II (3:3:0) Merchandising, promotion, and control policies of retail store management. Prerequisite: Mktg. 805.

807. INTRODUCTION TO MARKETING RESEARCH (3:3:0) Managerial aspects of marketing research, with emphasis on practical details of operating a small-scale project. Prerequisites: Mktg. 800, Q.B.A. 801.

809. PRODUCT PLANNING AND DEVELOPMENT (3:3:0) Problems faced by the product or branch manager including those of planning, research, and consumer satisfaction. Prerequisite: Mktg. 800.

## MATHEMATICS (MATH)

4. INTERMEDIATE ALGEBRA (3:3:0) Polynomials, fractions, exponents, radicals, first and second degree equations and inequalities, relations and functions, systems of equations. Limited to students whose scores on the algebra proficiency examination indicate a need for this course.

5. COLLEGE ALGEBRA (3:3:0) Relations and functions; roots of polynomials and complex numbers; sequences, mathematical induction; binomial theorem; matrices, determinants; analytic geometry. Prerequisite: 1 unit of algebra or Math. 4.



6. PLANE TRIGONOMETRY (3:3:0) Functions; use of logarithms; solution of triangles; trigonometric equations; identities. Prerequisites: 1½ units of algebra or Math. 5; 1 unit of geometry.
10. PRECALCULUS MATHEMATICS (3:3:0) Polynomial expressions; simultaneous equations; exponents, logarithms, binomial theorem; polynomial roots; trigonometric functions; right triangles; identities, lines, and conic sections. Limited to students whose scores on the algebra and trigonometry proficiency examination indicate a need for this course.
17. FINITE MATHEMATICS (3:3:0) Introduction to logic, sets, probability. Prerequisite: 3 units of high school mathematics.
18. ELEMENTARY LINEAR ALGEBRA (3:3:0) Matrices and vectors; transformations; systems of linear equations; convex sets and linear programming. Prerequisite: 3 units of high school mathematics.
35. GENERAL VIEW OF MATHEMATICS (3:3:0) Survey of mathematical thought in logic, geometry, combinatorics, and chance.
36. INSIGHTS INTO MATHEMATICS (3:3:0) Examples of mathematical thought in number theory, topology, theory of symmetry, and chance. Prerequisite: one unit of algebra or Math. 4.
120. TECHNIQUES OF CALCULUS I (3:3:0) Functions and graphs, derivatives, applications. Students may take only one course for credit from Math. 65, 120, 161, 161A. Prerequisite: a satisfactory score on the algebra proficiency examination or, in the case of an unsatisfactory score, the course(s) necessary to make up the deficiencies.
121. TECHNIQUES OF CALCULUS II (3:3:0) Derivatives, integrals, applications, linear algebra. Students may take only one course for credit from Math. 66, 121, 162. Prerequisite: Math. 120.
161. ELEMENTARY CALCULUS WITH ANALYTIC GEOMETRY I (3:3:0) Derivatives, differentials, applications; integrations, applications; analytic geometry. Students may take only one course for credit from Math. 120, 161, 161A. Prerequisite or concurrent: satisfactory scores on both the algebra and trigonometry proficiency examinations or, in the case of unsatisfactory scores, the course(s) necessary to make up the deficiencies.
162. ELEMENTARY CALCULUS WITH ANALYTIC GEOMETRY II (3:3:0) Derivatives, integration, applications, analytic geometry, infinite series. Students may take only one course for credit from Math. 121, 162. Prerequisite: Math. 161.
200. NUMBER SYSTEMS (3:3:0) Introduction to sets and logic, properties of the natural numbers, integers, rational and real numbers, algorithms, applications to geometry. For elementary education students only.
240. INTERMEDIATE CALCULUS WITH APPLICATIONS I (3:3:0) Functions of two variables; the chain rule; vectors in space; double and triple integrals. Prerequisite: Math. 162.
250. DIFFERENTIAL EQUATIONS (3:3:0) Ordinary differential equations, applications, solutions by series. Students may take only one course for credit from Math. 250 and Math. 383. Prerequisite: Math. 240.
260. MATRICES AND STATISTICS (3:3:0) Systems of linear equations; matrix algebra; determinants; eigenvalues and eigenvectors; applications to differential equations; statistics. Prerequisite: Math. 162.
263. INTRODUCTION TO LINEAR ALGEBRA (3:3:0) Systems of linear equations, vector spaces, matrices, linear transformations, change of basis, determinants, characteristic roots and vectors. Prerequisite: Math. 162.
351. INTRODUCTION TO VECTOR ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS (3:3:0) Integral vector calculus, Fourier series, partial differential equations. Prerequisite: Math. 250. Students who have passed A.M. 451 may not schedule this course.
800. BUSINESS MATHEMATICS (3:3:0) Review of arithmetic, decimals, fractions, percentages, interest, and discounts; introduction to algebraic techniques; applications to business computations.
- 801-802. TECHNICAL MATHEMATICS (3:3:0 each) Elements of algebra and trigonometry for students in two-year technical programs. Prerequisites: 1 unit in algebra, 1 unit in plane geometry.
803. TECHNICAL CALCULUS (3:3:0) Selected introductory topics from analytic geometry, differential calculus, integral calculus. Prerequisites: Math. 801, 802.



## MECHANICAL ENGINEERING TECHNOLOGY (M E)

800. MECHANISMS (2:0:4) Motion in machine elements; strength and properties of materials; design of machine elements. Prerequisite: E.Mch. 811.
805. KINEMATICS (3:2:3) Graphical and analytical studies of relative motions, instant centers, velocity and acceleration in plane motions, slider crank mechanisms, cams, gears, gear trains, and flexible connectors. Prerequisites: E.G. 1, E.Mch. 811.
807. HEAT TRANSFER (3:3:0) Basic principles of conduction, convection, and radiation, emphasizing practical applications.
810. PRODUCT DESIGN (3:1:6) Design of machine elements including levers, bearings, shafts, clutches, springs, and gears; selection of ball bearings and belts; design of small mechanical devices. Prerequisites: E.Mch. 813, M.E. 805.
830. SELECTED TOPICS IN MECHANICAL ENGINEERING TECHNOLOGY (3) Individual or group work in mechanical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.
880. AIR POLLUTION ANALYSIS INSTRUMENTATION (8) Principles and applications of instruments for measuring particle and gaseous pollutants; theory, installation, operation, maintenance, and related instrumentation. Prerequisite: Math. 803, or one course in college mathematics.
881. ELEMENTARY THERMO AND FLUID DYNAMICS (2:2:0) Basic problems in compressible fluid flow. Laws of dynamics and thermodynamics, mechanical properties of fluids, elementary heat transfer. Prerequisites: Math. 803, Phys. 150.
882. AIR RESOURCE MANAGEMENT (2:2:0) Introduction to air pollution. Pollutants, sources, effects, air monitoring systems, air quality criteria and standards, governmental control programs and procedures.
883. AIR POLLUTION ANALYSIS INSTRUMENTATION (3:2:1) Fundamentals of chemistry, electronics, fluid flow, and small particle technology as applied to air pollution instrumentation. Prerequisites: Chem. 13, Phys. 150.
884. SAMPLING AND MONITORING PROGRAM (2:0:4) Instrumentation and site selection, field data acquisition for major air pollutants, data analysis and evaluation.

## METALLURGICAL ENGINEERING TECHNOLOGY (MET E)

800. METALLURGICAL LABORATORY PRACTICE (4:2:4) Instruction and practice in various metallurgical techniques. Prerequisite: Chem. 11. Prerequisite or concurrent: Phys. 150.
801. PRINCIPLES OF EXTRACTIVE METALLURGY (2:2:0) An introduction to several metals' extraction processes using a problem-solving approach. Prerequisite: Chem. 12.
802. PHYSICAL METALLURGY (3:2:2) Structures of metals and alloys; structure manipulations; structure-property relationships. Prerequisites: Chem. 12, Phys. 150, Math. 802, Met.E. 800.
803. MATERIALS TESTING (3:1:4) Applications of testing procedures to determine properties of inorganic materials.
804. FERROUS METALLURGY (3:2:2) Making, shaping, and heat treatment of cast irons and steels. Prerequisites: Chem. 12, Met.E. 800.
805. NONFERROUS METALLURGY (3:2:2) Extraction of nonferrous metals from their ores and subsequent compositional adjustment by refining and alloying. Prerequisites: Chem. 12, Met.E. 800.
806. SUMMER FIELD PRACTICE (3) Practical experience in the metallurgical industries.
807. PLANT TRIPS (1:0:3) Plant trips to metals industries; classroom discussion with metallurgists concerning their work, and the role of the metallurgical associate. Spring term, odd years.

## METEOROLOGY (METEO)

303. **INTRODUCTORY METEOROLOGY (3:2:2)** Nontechnical treatment of fundamentals of modern meteorology; effect of weather and climate on man and his activities. A student who took Meteo. 300 or 304 may take this course for 1 credit only.

## MICROBIOLOGY (MICRB)

1. **INTRODUCTORY MICROBIOLOGY (3:3:0)** Elementary principles of microbial and viral inter-relationships, morphology, and physiology; relation to food, water, soil, industry, and disease processes. Prerequisite: Chem. 12.

2. **INTRODUCTORY MICROBIOLOGY LABORATORY (2:0:4)** Qualitative and quantitative techniques with regard to recognition of bacteria and their processes on a microscopic, colonial, and physiological basis. Prerequisite or concurrent: Micrb. 1. Prerequisite: Chem. 12.

6. **ELEMENTARY MICROBIOLOGY (2:2:0)** Importance of microorganisms in public health and disease, agriculture and industry; descriptive course for nontechnical students.

7. **ELEMENTARY MICROBIOLOGY LABORATORY (1:0:2)** Selected techniques with regard to recognition and enumeration of bacteria; effects of chemical and physical agents on microorganisms. Prerequisite or concurrent: Micrb. 6.

101. **MEDICAL MICROBIOLOGY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15)** Procedures and techniques used to isolate and diagnose clinically significant organisms such as bacteria, fungi, and other human parasites. Prerequisites: Micrb. 1, 2.

102. **HEMATOLOGY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15)** Theoretical and practical aspects of hematological diagnostic studies related to erythrocyte and leukocyte disorders in man.

801. **CLINICAL LABORATORY ORIENTATION FOR MEDICAL LABORATORY TECHNICIANS (8:5:15)** Introduction to basic principles of clinical laboratory work, including the collection, handling, and preparation of biological samples.

## MINERAL PROCESSING (MN PR)

61. **INTRODUCTION TO COAL PREPARATION (3:3:0)** Theory and application of modern coal preparation practice. Sampling, crushing, sizing, gravity concentration, flotation, dewatering, drying; pollution control; flowsheets.

## MINING (MNG)

23. **MINERAL LAND AND MINE SURVEYING (3:0:9)** Surveying theory and practice applied to mineral lands and mines; traversing, leveling, mapping, shaft plumbing; stope, room, and development surveying. Prerequisites: E.G. 11, ½ unit of secondary school trigonometry.

30. **INTRODUCTION TO MINING ENGINEERING (3:2:3)** Examination, development, and exploitation of mineral deposits in case studies of mineral deposits and mines; unit operations, cycling, equipment, methods.

## MINING TECHNOLOGY (MNG T)

800. **MINING TECHNOLOGY ORIENTATION (1:0:2)** Films, slides, and lectures to acquaint the student with the coal mining industry and its impact on society.

801. **COAL MINING TECHNOLOGY (3:2:3)** Analysis of coal mining systems; integration of unit operations and mining methods for efficient mine production.

802. **MINE VENTILATION (3:2:3)** Quality and quantity analysis and control of mine atmosphere. Prerequisites or concurrent: Chem. 11, Phys. 150, Mng.T. 801.

## MUSIC

803. **STRATA CONTROL (3:2:3)** Fundamentals of stresses and strains in rocks; virgin and concentrated stresses; roof support, subsidence, bursts, and stability control. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Mng.T. 801.
804. **MINE PLANT TECHNOLOGY (3:2:3)** Electrical systems in mines; mechanical power applications and materials handling systems. Prerequisite: Phys. 150.
805. **MINE SYSTEMS TECHNOLOGY (3:2:3)** Quantitative methods of work measurement and their application to production and method study problems related to mines. Prerequisite: Mng.T. 801.
806. **MINE MANAGEMENT AND LAW (3:3:0)** The problems of the individual in coal mine management in relation to environment, employer, union, and law.
807. **ELECTRICAL MINE MACHINE CIRCUITS (3:2:3)** Topics of electrical power fundamentals, power and control circuits, motors and their mine applications will be covered. Prerequisite: Mng.T. 804.
808. **MINE POWER DISTRIBUTION (3:2:3)** Topics of high voltage circuits, underground transmission, power stations, power conversion, safety regulations, and power devices will be covered. Prerequisite: Mng.T. 804.
809. **MINE MACHINERY HYDRAULICS (3:2:3)** Topics of basic hydraulic principles and their application to mining and mine machinery will be covered. Prerequisites: Math. 802, Phys. 150.
810. **MINE MACHINE DYNAMICS (3:2:3)** Topics on basic machines and their application to the principles of mine machine operation will be covered. Prerequisites: E.Mch. 811, Phys. 150.
811. **PRACTICUM IN MINE MAINTENANCE (3:0:9)** Field and shop techniques in procedures of electrical, mechanical, and hydraulic phases of mine maintenance will be covered. Prerequisites: Mng.T. 804, Phys. 150.
815. **SURFACE MINING TECHNOLOGY (3:2:3)** Analysis of surface mining systems; integration of unit operations and equipment utilization for efficient operation. Prerequisite: Mng.T. 800.
816. **ELEMENTS OF SURFACE MINE DESIGN (3:2:3)** Exploration methods, pit planning, and design; drilling and fragmentation; loading and haulage systems; and slope stability. Prerequisite: Mng.T. 815.
817. **SURFACE MINING PRODUCTION TECHNOLOGY (3:2:3)** Application of time study and work measurement to surface production. Efficiency of equipment usage and equipment utilization scheduling. Prerequisite: Mng.T. 815.
818. **SURFACE MINING HYDROLOGY (3:3:0)** Water control and treatment; hydrologic studies before and after mining; impoundments and water treatment. Prerequisites: Chem. 11; Geosc. 1 or 20 or 101.
819. **RECLAMATION TECHNOLOGY (3:3:0)** Spoil-bank reclamation and contour grading; re-vegetation and reclaimed land utilization.

## MUSIC (MUSIC)

5. **THE FUNDAMENTALS OF MUSIC APPRECIATION (3:3:0)** Recitation and lectures with recorded examples of melody, harmony, rhythm, vocal and instrumental timbre, form, and program and absolute music.

## MUSIC EDUCATION (MU ED)

806. **MUSIC SKILLS FOR RECREATION LEADERS (3:3:0)** Theories and practice in music activities found in group and club settings. Appreciation, leadership techniques, and fundamental musicology.



## NUCLEAR ENGINEERING TECHNOLOGY (NUC E)

800. NUCLEAR AND ATOMIC SCIENCE (2:2:0) Introduction to the theories of atomic and nuclear structure and electromagnetic radiation. Prerequisites: Phys. 151, Math. 803.
801. RADIOLOGIC SAFETY (2:2:0) Discussion of basic radiation dose units, radiation monitoring techniques, biological effects of radiation, and AEC regulations. Prerequisite or concurrent: Nuc.E. 800.
802. ELEMENTS OF NUCLEAR TECHNOLOGY (2:2:0) Study of nuclear radiations, nuclear interactions, neutron diffusion, and reactor materials. Prerequisite: Nuc.E. 800.
803. ELEMENTS OF NUCLEAR POWER GENERATION (3:3:0) Survey of various reaction types with emphasis on fuel heat removal and power generation, shielding, fuel fabrication and reprocessing. Prerequisite: Nuc.E. 802.
804. INTRODUCTION TO REACTOR TECHNOLOGY (3:3:0) Steady state reactor theory, kinetic behavior of reactors and reactor control systems. Prerequisite: Nuc.E. 802.
805. PRINCIPLES OF MEASUREMENT (3:2:2) A study of measurement in the nuclear industry, including the instruments used, accuracy of measurement, and statistical justification. Prerequisites: E.E. 814, Phys. 151.
812. NUCLEAR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of radiation measurements and the diversified application of nuclear techniques. Prerequisites: Nuc.E. 801, 802.
814. REACTOR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of basic reactor experiments, control rod calibration, critical experiment, etc. Emphasis placed upon reactor operations. Must be taken with Nuc.E. 804. Prerequisite: Nuc.E. 801.
830. SELECTED TOPICS IN NUCLEAR ENGINEERING TECHNOLOGY (3) Individual or group work in nuclear engineering technology for students with specific occupational objectives. Prerequisite: fourth-term standing.

## \*NURSING (NURS)

800. FOUNDATIONS OF TECHNICAL NURSING I (6:4:8) Role of the nurse in society and the health care team; nursing techniques used to meet basic patient needs.
801. FOUNDATIONS OF TECHNICAL NURSING II (6:4:8) Nursing techniques utilized to meet the needs of the patient undergoing diagnosis or basic medical or surgical treatment. Prerequisite or concurrent: Biol. 29, 41, Micrb. 6, Nurs. 800.
802. TECHNIQUES OF NURSING IN CHILDHOOD (7:3:16) Application of nursing techniques to the health needs of persons in the 2-week-old to 19-year-old age group. Prerequisite: Nurs. 801.
803. TECHNIQUES OF NURSING THE MATURE PATIENT (7:3:16) Application of nursing techniques to the health needs of persons in the 20-year-old to 40-year-old age group. Prerequisite: Nurs. 801.
804. TECHNIQUES OF NURSING THE PATIENT IN THE MIDDLE YEARS (7:3:16) Utilizing of nursing techniques to meet the health needs of persons in the 41-year-old to 65-year-old age group. Prerequisite: Nurs. 801.
805. TECHNIQUES OF NURSING THE PATIENT IN SENESCENCE (7:3:16) Application of nursing techniques to meet the health needs of persons over 65 years of age. Prerequisite: Nurs. 801.
806. NURSING SEMINAR (3:3:0) Current issues in nursing and adjustments of the student to the role of the graduate technical nurse. Prerequisite or concurrent: Nurs. 801.

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\*Admission to the Nursing program is closed.



## NUTRITION (NUTR)

150. **ELEMENTARY NUTRITION (2:2:0)** Fundamentals of nutrition and its relation to human health. Students who have passed Nutr. 351 may not schedule this course.

351. **INTRODUCTORY PRINCIPLES OF NUTRITION (3:3:0)** The nutrients: food sources and physiological functions as related to human growth and well-being throughout life; current nutrition issues. Students who have passed Nutr. 150 may not schedule this course.

800. **NORMAL DIET MODIFICATIONS (4:3:3)** Modifications of normal diet to meet therapeutic needs in patient care and rehabilitation.

801. **NUTRITION COMPONENT OF THE FOOD SERVICE SYSTEM (3:3:0)** Introduction to basic nutrition principles and their application in a food service system.

## PHILOSOPHY (PHIL)

1. **CRITICAL THINKING AND ARGUMENT (3:3:0)** Principles of correct thinking; deductive and inductive inference; use and misuse of language in reasoning.

2. **INTRODUCTION TO EXISTENTIAL PHILOSOPHY (3:3:0)** Evaluation of the intellectual and moral tone of the present day through a study of existentialism and other recent philosophies. Prerequisite: fourth-term standing.

3. **ETHICS AND SOCIAL ISSUES (3:3:0)** Ethical issues such as war, privacy, crime and punishment, racism and sexism, civil liberties, affirmative action, abortion, and euthanasia.

4. **BASIC PROBLEMS OF PHILOSOPHY (3:3:0)** How important philosophers have treated the perennial problems of knowledge, reality, free will, etc.

12. **ELEMENTS OF SYMBOLIC LOGIC (3:3:0)** How to translate arguments into symbolic language and test them for validity using truth-tables and deduction rules. For nonscience majors.

103. **MAN AND MORAL VALUE (3:3:0)** Freedom, choice, and obligation in conduct; values in a scientific age; the pursuit of happiness and other goals of life. Prerequisite: fourth-term standing.

108. **SOCIAL AND POLITICAL PHILOSOPHY (3:3:0)** Philosophical analysis of political and communal order; ideal standards of individual and group action within practical structure of social obligation. Prerequisite: fourth-term standing.

111. **ORIENTAL PHILOSOPHY (3:3:0)** Outstanding contributions to philosophic and religious thought in the Near East, India, and China. Prerequisite: fourth-term standing.

212. **SYMBOLIC LOGIC (3:3:0)** The logic of classes, propositions, relations, and quantification; the nature and properties of formal systems. Intended primarily for science-oriented students. Prerequisite: fourth-term standing.

## PHYSICAL EDUCATION (PH ED)

\*5. **PHYSICAL EDUCATION (1:0:3 per term)** Activities to develop physical and recreational skills; beginning swimming required of those who fail swim-safety test. Selection from archery, badminton, bowling, canoeing, cross-country skiing, dancing, fencing, figure skating, golf, handball, hunter safety, orienteering, racquetball, riflery, sailing, scuba, squash, survival training, swimming, tennis, volleyball, weight training, and others. Typically, two activities per term.

9. **LIFE SAVING AND WATER SAFETY (1:0:3)** Course outlined by the American Red Cross; prepares the student for the Senior Life Saving examination. Prerequisite: passing of qualifying swimming test.

801. **LIFETIME SPORTS (1:0:3)** Basic understanding of the fundamentals of lifetime sports and the leadership and supervision of such sports.

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\*Must be repeated for a total of 3 credits to satisfy University Baccalaureate Degree Requirements.

- 802. SWIMMING (1:0:3) Fundamentals of swimming and the supervision of aquatic facility programs.
- 803. GAMES FOR CHILDREN (1:0:3) Low organized and lead-up games with emphasis on age group differences.
- 804. DANCE AND GYMNASTICS (1:0:3) Understanding dance forms and rudiments of gymnastics.
- 805. TEAM SPORTS (1:0:3) Basic understanding of the fundamentals of team sports, and the leadership and supervision of such sports.
- 806. OFFICIATING (1:0:3) Theory and practice of officiating games and sports.
- 807. ADAPTED ACTIVITIES (1:0:3) Adaptation of activities and methods of presentation of games for the handicapped.

## PHYSICAL SCIENCE (PH SC)

- 7. PHYSICAL SCIENCE (3:3:0) Development of physics, including modern physical concepts and their relationship to the careers of physical scientists. May not be scheduled by students who have received credit for Phys. 201 or 215.
- 8. PHYSICAL SCIENCE (3:3:0) Selected concepts of chemistry showing their development, interrelationship, and present status. May not be scheduled by students who have received credit for Chem. 11 or 12.

## PHYSICIAN'S ASSISTANT (P A)

- 800. MECHANISMS OF BODY FUNCTIONS I (2:1:2) Introduction of principles of anatomy, physiology, and biochemistry relating to structure and function of cells and tissues.
- 801. MECHANISMS OF BODY FUNCTIONS II (2:1:2) Continuation of P.A. 800. An integration of biological principles relating to structure and function of selected organ systems. Prerequisite: P.A. 800.
- 802. Mechanisms of Body Functions III (2:1:2) Continuation of P.A. 801. An investigation of biological principles relating to structure and function of selected organ systems. Prerequisite: P.A. 801.
- 805. MICROBIOLOGY (2:2:0) Study of common fungi, bacteria, and viruses with regard to colonization, growth, nutrition, and cultivation, as they relate to common diseases.
- 807. HUMAN GENETICS (1:1:0) Basic principles of classical genetics as they relate to problems presented in a primary care setting.
- 810. HUMAN BEHAVIOR: PRINCIPLES AND HEALTH PROBLEMS I (2:2:0) Introduction to the principles of behavioral science for understanding behavior and behavior modification necessary for health maintenance.
- 811. HUMAN BEHAVIOR: PRINCIPLES AND HEALTH PROBLEMS II (2:1:2) Continuation of P.A. 810. Principles of behavioral science for understanding behavior and behavior modification necessary for health maintenance. Prerequisite: P.A. 810.
- 820. PATIENT-ORIENTED CARE I—RELATING TO THE PATIENT (1:0:2) Development of the comprehensive approach to patient care. An introduction to interpersonal skills, interviewing, and data gathering.
- 821. PATIENT-ORIENTED CARE II—PROBLEM ANALYSIS (2:2:0) Continuation of P.A. 820. An introduction to health care systems, the natural history of disease, data recording, data synthesis. Prerequisite: P.A. 820.
- 822. PATIENT-ORIENTED CARE III—THE PATIENT, THE PRACTICE, AND THE COMMUNITY (2:2:0) Continuation of P.A. 821. An introduction to disease patterns, epidemiologic terminology, individual and environmental problems, and resources in the community context. Prerequisite: P.A. 821.

## PHYSICS

830. **MEDICAL-SURGICAL PROBLEMS I (2:1:2)** Introduction to the principles of assessment and management of selected medical-surgical problems in a primary care setting.
831. **MEDICAL-SURGICAL PROBLEMS II (2:1:2)** Continuation of P.A. 830. Introduction to the principles of assessment and management of selected medical-surgical problems. Prerequisite: P.A. 830.
832. **MEDICAL-SURGICAL PROBLEMS III (2:1:2)** Continuation of P.A. 831. Introduction to the principles of assessment and management of selected medical-surgical problems. Prerequisite: P.A. 831.
840. **DIAGNOSTICS (1:0:2)** An introduction to basic laboratory, radiological, and electrocardiograph studies used in a primary care setting.
850. **THERAPEUTICS (2:1:2)** An introduction to basic applied clinical therapeutics, with emphasis on significant modalities used in the primary care setting.
860. **EMERGENCY MEDICINE (2:2:0)** Introduction to the initial evaluation and management of common problems seen in an emergency room setting. Prerequisite: P.A. 820.
870. **PEDIATRICS (2:2:0)** An introduction to the basic principles used in caring for normal children and children with specific problems. Prerequisite: P.A. 820.
880. **PRACTICUM IN PRIMARY HEALTH CARE DELIVERY I (10)** Emphasis on health maintenance, periodic appraisal of adults, evaluation of common medical-surgical problems, and implementation of therapeutic modalities.
881. **PRACTICUM IN PRIMARY HEALTH CARE DELIVERY II (10)** Emphasis on health maintenance, periodic appraisal of children, evaluation of common medical-surgical problems, and implementation of therapeutic modalities.
882. **PRACTICUM IN PRIMARY HEALTH CARE DELIVERY III (10)** Emphasis on health maintenance, periodic appraisal of adults, evaluation of common medical-surgical and behavioral problems, and implementation of therapeutic modalities.

## PHYSICS (PHYS)

150. **TECHNICAL PHYSICS (3:2:2)** Elementary treatment of topics in mechanics, heat, wave motion, and sound leading toward an understanding of technical applications. Prerequisite: 1½ units of algebra. Prerequisite or concurrent: Math. 801.
151. **TECHNICAL PHYSICS (3:2:2)** Elementary treatment of topics in electricity, light, and modern physics leading toward an understanding of technical applications. Prerequisite: Phys. 150.
201. **GENERAL PHYSICS (4:4:0)** Mechanics, wave motion, and sound. Prerequisite: Math. 162.
202. **GENERAL PHYSICS (4:3:2)** Electricity and magnetism. Prerequisite: Phys. 201.
203. **GENERAL PHYSICS (3:3:0)** Heat, optics, and modern physics. Prerequisite: Phys. 202.
204. **GENERAL PHYSICS (4:3:2)** Heat, optics, and modern physics with laboratory. Prerequisite: Phys. 202.
215. **INTRODUCTORY PHYSICS (4:3:2)** Selected topics in mechanics, heat, and sound. Prerequisite: algebra to quadratics.
237. **INTRODUCTION TO ATOMIC AND NUCLEAR PHYSICS (3:3:0)** Atomic and molecular theory, relativity, elementary particles, nuclear structure and reactions. Prerequisites: Phys. 203, 204.
265. **INTRODUCTORY PHYSICS (4:3:2)** Selected topics in light, electricity, and magnetism. Prerequisite or concurrent: Phys. 215.
297. **SPECIAL TOPICS (1-6)**



## PLANT SCIENCE (PLTSC)

801. PRODUCTION OF HORTICULTURAL CROPS (3:2:2) The application of scientific principles to horticultural crop production.

802. USE OF AGRICULTURAL CHEMICALS (3:2:2) Principles and practices relating to safe and effective control of weeds, insects, and plant diseases through use of chemical toxicants.

## POLITICAL SCIENCE (PL SC)

1. AMERICAN NATIONAL GOVERNMENT (3:3:0) Development and nature of American political culture; constitutional and structural arrangements; policy-making processes; sources of conflict and consensus.

2. AMERICAN PUBLIC POLICY (3:3:0) Examination of selected areas of public policy in America. Analysis of policy content, alternatives and impact. Prerequisite: Pl.Sc. 1.

3. GOVERNMENT AND POLITICS IN MODERN SOCIETY (3:3:0) Introduction to study of government and politics. Normative and empirical theories; governmental functions in modern communities; representative structures and processes.

14. INTERNATIONAL RELATIONS (3:3:0) Characteristics of modern nation-states and forces governing their international relations; nationalism; imperialism; diplomacy; current problems of war and peace. Credit will not be given for both this course and Int.U. 200.

20. COMPARATIVE POLITICS—WESTERN EUROPE (3:3:0) Comparative analysis of political cultures, interest groups, parties, and decision-making processes in principal Western European political systems.

## POULTRY SCIENCE (PTYSC)

801. POULTRY PRODUCTION (2:1:2) Practical aspects of poultry, nutrition, management, disease control, and marketing in the production of broilers, eggs, and turkeys.

## PSYCHOLOGY (PSY)

2. PSYCHOLOGY (3:3:0) Introduction to general psychology; principles of human behavior and their applications.

13. INTRODUCTION TO DEVELOPMENTAL PSYCHOLOGY (3:3:0) Developmental principles; physical growth; linguistic, intellectual, emotional, and social development from infancy to maturity. Prerequisite: Psy. 2.

37. MENTAL HEALTH (3:3:0) Maintaining adjustment, developing a well-balanced personality; behavior disorders and their treatment. May not be used as prerequisite for any course in psychology. Not open to psychology majors or those who have credit for Psy. 437.

102. RESEARCH METHODS IN PSYCHOLOGY (4:1:6) Designed to develop skills in nonlaboratory research techniques, particularly methods used in field studies and sample survey research. Prerequisites: Psy. 2, Stat. 200.

## QUANTITATIVE BUSINESS ANALYSIS (Q B A)

101. INTRODUCTION TO QUANTITATIVE BUSINESS ANALYSIS (3:3:0) Introduction to quantitative methods for conceptualizing business and management problems. Prerequisite: Math. 18 or 120.

102. ELEMENTARY BUSINESS STATISTICS (3:3:0) Statistical inference; estimation, hypothesis testing, testing, correlation, and regression; application of statistical techniques to economic and business problems. Prerequisite: Q.B.A. 101.

801. ELEMENTARY BUSINESS STATISTICS (3:3:0) Collection, tabulation, measurement, presentation, and interpretation of quantitative material. Prerequisite: fourth-term standing.



## **RADIOLOGIC TECHNOLOGIST RADIOGRAPHER (R T R)**

1. HISTORY OF RADIOLOGY; ELEMENTARY RADIATION PROTECTION; MEDICAL ETHICS (1:2:6) History of radiology field, basic principles of radiation protection, applications of medical ethics, base office procedures, departmental structure.
20. MEDICAL TERMINOLOGY; RADIOGRAPHIC POSITIONING I (1:3:5) Introduction to the medical profession's language; basic positional terminology, emphasis on skeletal positioning with skull introduction.
30. RADIOGRAPHIC EXPOSURE I; FILM CRITIQUE I (1:3:5) Preliminary exposure factors concerning radiographic imaging; evaluation of radiographic films.
40. RADIOGRAPHIC POSITIONING II: CONTRAST PROCEDURES; NURSING PROCEDURES (5:3:13) Body system positionings, radiologic applications on contrast media, nursing procedures pertinent to radiologic technology. Prerequisite: R.T.R. 20.
50. RADIOGRAPHIC EXPOSURE II (1:2:5) Emphasis on problem solving and formation of technique chart. Prerequisite: R.T.R. 30.
60. DARKROOM CHEMISTRY; FILM CRITIQUE II (1:3:5) Film composition, manifestation of latent image and film processing techniques; continuation evaluation of radiographic films. Prerequisites: Chem. 11, R.T.R. 30.
70. RADIOGRAPHIC POSITIONING III (1:2:6) Review of skeletal, skull, and body systems; emphasis on pediatric, geriatric, psychiatric, and intra-oral radiography. Prerequisite: R.T.R. 40.
80. SPECIAL PROCEDURES; REGISTRY REVIEW (1:5:14) Invasive contrast procedures pertinent to radiology. Tomography, paradiologic imaging modalities; review for registry examination. Prerequisite: R.T.R. 70.
90. MEDICAL AND SURGICAL DISEASES; REGISTRY REVIEW II (1:3:14) Review of registry examination, definition of various diseases, and pathology pertaining to bodily systems. Prerequisites: Biol. 41, R.T.R. 80.

## **READING, COMMUNICATION, AND LANGUAGE EDUCATION (RCLED)**

5(A,B). COLLEGE READING SKILLS IMPROVEMENT (2-4) Improving reading comprehension, vocabulary, rate, study skills, and integrating these more efficiently in course work.

*Unit A:* Average or better readers seeking advanced work or preparation for specific goals.

*Unit B:* Limited to students needing developmental reading instruction and recommended on the basis of reading entrance test scores.

## **REAL ESTATE (R EST)**

800. REAL ESTATE PRINCIPLES (3:3:0) Nature of the real estate market; introduction to the functions performed in the real estate business.
810. REAL ESTATE SALES (3:3:0) Principles underlying the sale of real estate; the use of selling tools and procedures in the analysis of customers' needs.
830. REAL ESTATE FINANCE (3:3:0) Basic principles of real estate finance; sources of funds for financing real estate.

## **RECREATION AND PARKS (RC PK)**

120. LEISURE AND HUMAN EXPERIENCE (3:3:0) Introduction to leisure in historical and contemporary perspective. Relationships between leisure and other social institutions. Determinants of leisure behavior.
130. OUTDOOR LIVING SKILLS (1:0:3) Direct experience with outdoor living skills and backpacking; weekend campout. American Camping Association's Advanced Campcraft certifica-

tion skills covered. Prerequisite: American Red Cross Standard First Aid and Personal Care certificate recommended.

190. PERSPECTIVES FOR THE RECREATION AND PARKS PROFESSIONAL (3:2:2) Historical view of recreation and parks movement in the U.S.; observation and analysis services; investigation of professional preparation.

230. CAMP COUNSELING (2:1:2) Counselor skills and responsibilities for the organized camp.

236. THEORY AND PRACTICE OF RECREATION LEADERSHIP (3:2:2) Methods and materials; experience in recreation leadership with different age groups and in a variety of school and community settings.

295. THE SCOPE OF RECREATION AND PARKS SERVICES (1) Observation of and exposure to components, programs, and agencies which make up the field of recreation and parks services.

850. FIELD PRACTICUM (3) Observation and participation in a recreation system, hospital, youth-serving agency, or other setting.

856. RECREATION PROGRAM PLANNING (3:3:0) The theory and exploration of program planning in the various recreation settings. Policies and philosophies pertinent to the program areas.

875. INTRODUCTION TO THERAPEUTIC RECREATION (3:3:0) Recreation for the mentally retarded, physically handicapped, emotionally disturbed, the aged, and the culturally different in institutions and community settings.

877. THERAPEUTIC RECREATION PROGRAM (3:3:0) Critical examination of therapeutic recreation leader's role in relation to other human services, activity analysis, and counseling techniques. Prerequisite: Rc.Pk. 875.

## RELIGIOUS STUDIES (RL ST)

1. INTRODUCTION TO THE STUDY OF RELIGION (3:3:0) Origin and function of religion in the individual and culture; outstanding personalities, sacred books, interaction of religion with culture.

19. RELIGION IN AMERICAN LIFE AND THOUGHT (3:3:0) The function, contributions, tensions, and perspectives of religion in American culture.

141. (C.Lit. 141) RELIGION AND THE CREATIVE IMAGINATION (3:3:0) An examination of the arts as expression of man's religious dimension, focusing on the study of contemporary literature.

## RETAILING (RTL)

833. SELECTION AND USE OF TEXTILES (3:2:4) Selection, use, and care of textile products as affected by fiber, yarn, and fabric construction, and finishing processes.

834. FORCES OPERATING IN THE CLOTHING AND TEXTILE INDUSTRY (2:2:0) Description of ways in which operations of the various segments of the clothing and textiles industry impinge on retailing. Prerequisites: Mktg. 804, 805, 806.

840. MANAGEMENT IN THE HOME (3:3:0) The principles of decision making, work simplification, use of equipment, and home safety applied to family management.

850. DISPLAY TECHNIQUES (2:1:3) Display as visual communication, emphasizing the techniques related to merchandising and art. Prerequisite: an art or art appreciation course.

## SCIENCE, TECHNOLOGY, AND SOCIETY (S T S)

100. THE ASCENT OF MAN (3:3:0) A survey of some of the intellectual achievements which highlight mankind's attempts to understand nature and shape the environment.

## **SOCIAL SCIENCE (SO SC)**

1. **THE URBANIZATION OF MAN: A SOCIAL SCIENCE PERSPECTIVE (3:3:0)** An overview of the social sciences, including an interdisciplinary analysis of the urban process.
2. **CONTEMPORARY MAN AND SOCIETY (3:3:0)** Selected contemporary issues in the perspective of history, sociology, psychology, economics, and political science.
110. **INTRODUCTION TO CONTEMPORARY AFRICA (3:3:0)** Consideration of influences and forces at work; leaders, elites, and groups. Analysis of problems and issues in Africa.

## **SOCIAL STUDIES (SO ST)**

800. **HUMAN CULTURES AND THE INDIVIDUAL (3:3:0)** Basic components of human cultures, with emphasis upon specific elements of American culture.
801. **CRITICAL AND VISIONARY CONCEPTS OF SOCIETY (3:3:0)** Critical and visionary concepts of society from the Renaissance to the present, including major theorists, commentators, and imaginative writers.

## **SOCIOLOGY (SOC)**

1. **INTRODUCTORY SOCIOLOGY (3:3:0)** Social structure; basic human institutions; analysis of social processes; major social forces.
3. **INTRODUCTORY SOCIAL PSYCHOLOGY (3:3:0)** Culture, conduct, and the sociogenesis of behavior.
5. **SOCIAL PROBLEMS (3:3:0)** Poverty, delinquency, crime; family discord; industrial, race, and nationality conflicts; mental disorders.
7. **METHODOLOGY OF SOCIOLOGY (3:3:0)** Introduction to the nature, collection, and interpretation of materials used by social scientists in research and publication. Prerequisite: 3 credits in sociology.
30. **SOCIOLOGY OF THE FAMILY (3:3:0)** Family structure and interaction; functions of the family as an institution: cross-cultural comparisons. Prerequisite: 3 credits in sociology.

## **SOLAR TECHNOLOGY (S T)**

801. **INTRODUCTION TO SOLAR TECHNOLOGY (2:1:2)** Introduction to solar technology from the standpoint of history, ecology, and energy.
802. **SOLAR COLLECTORS (3:2:2)** Analysis and application of air-type and fluid-type solar collectors. Prerequisites: A.E. 803, M.E. 881, and S.T. 801.
803. **HEAT STORAGE AND DISTRIBUTION SYSTEMS (3:2:2)** Analysis and application of heat storage and distribution systems; layout of systems. Concurrent: S.T. 802.
804. **ANALYSIS OF SOLAR HEATING AND COOLING SYSTEMS (3:1:5)** Comprehensive analysis and application of solar heating and cooling systems. Calculations and layout. Prerequisites: A.E. 809, S.T. 802, 803.
805. **ECONOMICS OF SOLAR TECHNOLOGY SYSTEMS (3:2:2)** Economic analyses of active and passive solar heating and cooling systems. Prerequisite: S.T. 801.

## **SPANISH (SPAN)**

1. **ELEMENTARY SPANISH (4:3:2)** Audio-lingual approach to basic Spanish; writing.
2. **ELEMENTARY SPANISH (4:3:2)** Audio-lingual approach to basic Spanish continued; writing. Prerequisite: Span. 1.
3. **INTERMEDIATE SPANISH (4:3:2)** Audio-lingual review of structure; writing; reading. Prerequisite: Span. 2.



131. **IBERO-AMERICAN CIVILIZATION (3:3:0)** Spanish American and Brazilian life from the Conquest to the present: literature, art, the indigenous heritage, and contemporary problems.

## **SPEECH COMMUNICATION (SPCOM)**

200. **EFFECTIVE SPEECH (3:3:0)** Introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.

*Unit A.* Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation.

*Unit B.* Principles of communication, implemented through group problem solving, with some attention to formal speaking and message evaluation.

*Unit C.* Principles of communication, implemented through analysis and evaluation of messages, with some attention to formal speaking and group discussion.

280. **ORAL INTERPRETATION (3:3:0)** Principles of oral interpretation of the printed page with practice in oral reading of poetry, prose, and drama.

330. **STUDIO PRACTICUM (1-3)** Supervised experience in the arts and crafts of radio and television production. Prerequisite: Sp.Com. 325 or 340.

801. **SURVEY OF BROADCASTING (3:3:0)** Introduction to broadcasting: history, organization, responsibilities, laws, rules and regulations.

802. **RADIO AND TELEVISION ANNOUNCING (3:1:4)** The study and application of oral communication techniques for radio and television announcing, including basic operation of related equipment.

803. **BASIC WRITING FOR RADIO AND TELEVISION (3:1:4)** Techniques of writing for radio and television stations, emphasizing copy and news writing. Prerequisite: Engl. 10.

804. **RADIO PROGRAMMING, PRODUCTION, AND PERFORMANCE (3:1:4)** Introduction to basic elements of radio programming and production, including developing, producing, and performing in radio announcements and programs. Prerequisites: Sp.Com. 801, 802, 803.

805. **TELEVISION PROGRAMMING, PRODUCTION, AND PERFORMANCE (3:1:4)** Introduction to basic elements of television programming and production, including developing, producing, and performing in television announcements and programs. Prerequisite: Sp.Com. 804.

830. **DIRECTED STUDIES (1-3)** Individual or group work in broadcast studies and/or projects for second-year students with specific occupational objectives. Prerequisite: Sp.Com. 805 and sixth-term standing.

## **STATISTICS (STAT)**

200. **ELEMENTARY STATISTICS (4:3:2)** Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. Prerequisite: 2 units in algebra.

318. **ELEMENTARY DISCRETE PROBABILITY (3:3:0)** Discrete probability spaces; random variables; expectations; independence and dependence; introduction to Markov chains and other stochastic processes. Prerequisite: Math. 17 or 120 or 161.

## **TELECOMMUNICATIONS (TELCM)**

840. **INTRODUCTION TO TELECOMMUNICATIONS SYSTEMS (2:2:0)** Elements of telecommunications systems including telephones, transmission lines, switching, digital data, and transmission by microwave, satellite, and fiber optics.

841. **SWITCHING AND TRAFFIC (3:3:0)** Routing of telecommunications messages: characteristics, methods, and control. Prerequisite: TelCm. 840.



## THEATRE ARTS

842. **ELEMENTARY TELECOMMUNICATIONS LABORATORY (1:0:2)** Basic measuring equipment for telecommunications systems. Prerequisite: TelCm. 840. Prerequisite or concurrent: TelCm. 841.
843. **TRANSMISSION (3:3:0)** Transmission of telecommunications information, including design problems. Prerequisites: TelCm. 841, 842.
844. **ADVANCED TELECOMMUNICATIONS LABORATORY (1:0:2)** Installation, alignment, and operation of advanced telecommunication equipment. Prerequisite or concurrent: TelCm. 843.

## THEATRE ARTS (THEA)

100. **THE ART OF THE THEATRE (3:3:0)** Forms and styles of dramatic experience; cultural functions of theatre in the past and present. For nontheatre majors only.
104. **PROCESSES OF THEATRE PRODUCTION (3:1:4)** The procedures of design, coordination, and execution of scenery, costumes, lighting, and sound for nonprofessional productions.
109. **THE DRAMATIC ARTS IN THE MASS MEDIA (3:3:0)** The place of television-radio-film drama in our culture; relationship with other art forms; standards of evaluation.
190. **THE ART OF THE CINEMA (3:3:0)** The development of cinema to its present state; principles of evaluation and appreciation; examples from the past and present.
806. **INTRODUCTION TO CREATIVE DRAMATICS (3:1:4)** Introduction and direct experience in creative dramatics and survey of children's theatre.

## WILDLIFE (WILDL)

801. **INTRODUCTION TO WILDLIFE MANAGEMENT (3:3:0)** Basic principles of wildlife management. Introduction to general ecology and wildlife population dynamics.
803. **ANIMAL IDENTIFICATION (3:2:3)** Identification of mammals, birds, reptiles, amphibians, and fishes; introduction to their life histories.
804. **WILDLIFE MENSURATION (3:2:3)** The measurement of animal populations and vegetation samples.
805. **FIELD AND LABORATORY TECHNIQUES (3:1:6)** Techniques utilized in wildlife research and management; introduction to mapping, photography, census, record keeping, and measurement of population structure. Prerequisites: For. 802, Wildl. 801, 803, 804, 812, 814. Concurrent: Wildl. 806.
806. **OPERATIONAL PROCEDURES AND EQUIPMENT (2:1:3)** Summer camp for operational procedures and the operation and maintenance of wildlife equipment and facilities. Concurrent: Wildl. 805.
807. **OUTDOOR RECREATION (3:2:3)** Sociology, history, and economics of recreational demand; recreational areas and management procedures.
809. **ANIMAL CARE (3:2:3)** Care and handling of captive wild animals.
811. **AERIAL PHOTO INTERPRETATION (4:2:6)** Techniques of photo interpretation; type mapping of wildlife environments; photo censusing of wild animals.
812. **WILDLIFE FIELD SURVEYS (3:2:3)** Terrestrial measurement, methods of plotting, area determinations, cover, and type mapping.
813. **FISHERIES MANAGEMENT FOR TECHNICIANS (3:2:3)** Introduction to fisheries management, biology of fishes, aquatic ecology, use and care of equipment, habitat surveys, and management practices.
814. **HABITAT MANAGEMENT (3:0:9)** Identification, ecological characteristics, manipulation of food and cover plants. Animal needs, range and habitat analysis, and management for wildlife.

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University Bulletin

Associate Degree Programs





**1982-1983**

# **The Pennsylvania State University Bulletin**

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## **ASSOCIATE DEGREE PROGRAMS**

### **STATEMENT OF NONDISCRIMINATION**

The Pennsylvania State University, in compliance with applicable federal and state equal opportunity laws and regulations governing affirmative action and nondiscrimination, does not discriminate in the recruitment, admission, and employment of students, faculty, and staff in the operation of any of its educational programs and activities as defined by law. Accordingly, nothing in this publication should be viewed as directly or indirectly expressing any limitation, specification, or discrimination as to race, religion, color, or national origin; or to handicap, age, sex, or status as a disabled or Vietnam-era veteran, except as provided by law. Any inquiries concerning this policy may be directed to the vice president for student affairs.

### **REGULATIONS SUBJECT TO CHANGE**

The educational process necessitates change. This bulletin must be considered as informational and not binding on the University.

Each step of the educational process, from admission through graduation, requires continuing review and appropriate approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

**THE PENNSYLVANIA STATE UNIVERSITY BULLETIN (USPS 426-680)**

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# UNIVERSITY CALENDAR\*

## WINTER TERM 1982

### NOVEMBER 1981

- 29 Sunday—Arrival date
- 30 Monday—Orientation and advising

### DECEMBER

- 1,2 Tuesday and Wednesday—Registration
- 3 Thursday—Classes begin 8:00 a.m.
- 19 Saturday—Christmas and New Year's recess begins 12:25 p.m. (continues to Sunday, January 3, 1982)

### JANUARY 1982

- 4 Monday—Winter term classes resume 8:00 a.m.

### FEBRUARY

- 24 Wednesday—Classes end 9:55 p.m.
- 25-27 Thursday to Saturday—Final examinations

### MARCH

- 1 Monday—Final examinations
- 6 Saturday—Commencement

## SPRING TERM 1982

### MARCH

- 7 Sunday—Arrival date
- 8 Monday—Orientation and advising
- 9,10 Tuesday and Wednesday—Registration
- 11 Thursday—Classes begin 8:00 a.m.

### MAY

- 19 Wednesday—Classes end 9:55 p.m.
- 20-22 Thursday to Saturday—Final examinations
- 24 Monday—Final examinations
- 29 Saturday—Commencement

## SUMMER TERM 1982

### JUNE

- 6 Sunday—Arrival date (ten-week term)
- 7 Monday—Orientation and advising (ten-week term)
- 8 Tuesday—Registration (ten-week term)
- 9 Wednesday—Classes begin 8:00 a.m. (ten-week term)
- 22 Tuesday—Registration (eight-week special summer program)
- 23 Wednesday—Classes begin 8:00 a.m. (eight-week special summer program)

### JULY

- 5 Monday—Independence Day holiday, no classes +

### AUGUST

- 18 Wednesday—Classes end 9:55 p.m. (ten-week term and eight-week special summer program)
- 19-21 Thursday to Saturday—Final examinations (ten-week term and eight-week special summer program)
- 28 Saturday—Commencement

\*This calendar is subject to change without notice. Although the University makes every effort to avoid conflicts with religious holidays in preparing the calendar for an academic year, such conflicts are sometimes unavoidable. When they occur, efforts are made to make special arrangements for the students affected.

+ Classes that would have met on Monday, July 5, 1982, will meet on Wednesday, August 18, 1982.

## FALL TERM 1982

### AUGUST

- 30 Monday—Arrival date for new students
- 31 Tuesday—Orientation and advising

### SEPTEMBER

- 1-3 Wednesday to Friday—Orientation, advising, and registration
- 2,3 Thursday and Friday—Registration
- 6 Monday—Labor Day holiday, no classes
- 7 Tuesday—Classes begin 8:00 a.m.

### NOVEMBER

- 15 Monday—Classes end 9:55 p.m.
- 16-19 Tuesday to Friday—Final examinations
- 25 Thursday—Thanksgiving
- 27 Saturday—Commencement

## WINTER TERM 1983

### NOVEMBER 1982

- 28 Sunday—Arrival date
- 29 Monday—Orientation and advising
- 30 Tuesday—Registration

### DECEMBER

- 1 Wednesday—Registration
- 2 Thursday—Classes begin 8:00 a.m.
- 21 Tuesday—Christmas and New Year's recess begins 9:55 p.m. (continues to Sunday, January 2, 1983)

### JANUARY 1983

- 3 Monday—Winter term classes resume 8:00 a.m.

### FEBRUARY

- 21 Monday—Classes‡ end 9:55 p.m.
- 22-25 Tuesday to Friday—Final examinations

### MARCH

- 5 Saturday—Commencement

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‡Follow Wednesday class schedule on Monday, February 21, 1983.



# UNIVERSITY ADMINISTRATION

JOHN W. OSWALD, A.B., Ph.D., LL.D., D.Sc., L.H.D. *President*

## GENERAL AND STAFF OFFICERS

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RICHARD E. GRUBB, B.S., M.S., D.Ed. *Senior Vice President for Administration*  
ROBERT A. PATTERSON, B.S., M.B.A., LL.D. *Senior Vice President for Finance and Operations*  
HARRY PRYSTOWSKY, M.D. *Provost of Hershey Medical Center*  
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GEORGE W. BIERLY, B.S. *Director Emeritus*  
NILS A. PARR, B.A., M.F., Ph.D. *Associate Director for Academic Affairs*  
ROBERT SABATINO, B.S., M.S. *Acting Associate Director for Academic Affairs*

JAMES F. CAMPBELL, B.S., M.S. *Assistant Director for Continuing Education*  
 JOHN R. MURPHY, B.A., M.S. *Dean of Student Affairs*  
 JOHN M. BALOGA, B.S. *Business Manager*

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 ROBERT E. DAWSON, Ph.B., M.A. *Director Emeritus*  
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 ARTHUR A. HEIM, B.S. *Assistant Director for Continuing Education*  
 PATRICK J. ROSE, B.S., M.S. *Dean of Student Affairs*  
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 JOHN C. MARSHALL, B.S., M.Ed. *Assistant Director for Continuing Education*  
 DAVID R. STEWART, B.S., M.Ed., D.Ed. *Dean of Student Affairs*  
 TERRY K. ENGDAHL, B.A., M.S. *Assistant Director for University Relations*  
 VONI B. GRIMES *Business Manager*

**PENN STATE CAMPUSES**

**\*UNIVERSITY PARK CAMPUS**

University Park, PA 16802  
 Area Code 814 865-4700

**ALLENTOWN CAMPUS**

Academic Building, Fogelsville, PA 18051  
 Area Code 215 285-4811

**ALTOONA CAMPUS**

Smith Building, Altoona, PA 16603  
 Area Code 814 946-4321

**BEAVER CAMPUS**

Brodhead Road, Monaca, PA 15061  
 Area Code 412 775-8830

**\*BEHREND COLLEGE**

Erie (Station Road, Wesleyville), PA 16563  
 Area Code 814 898-1511

**BERKS CAMPUS**

R.D. 5, Tulpehocken Road, P.O. Box 2150,  
 Reading, PA 19608  
 Area Code 215 375-4211

**\*CAPITOL CAMPUS**

Middletown, PA 17057  
 Area Code 717 783-6250

**DELAWARE COUNTY CAMPUS**

25 Yearsley Mill Road, Media, PA 19063  
 Area Code 215 565-3300

**DuBOIS CAMPUS**

College Place, DuBois, PA 15801  
 Area Code 814 371-2800

**FAYETTE CAMPUS**

P.O. Box 519, Uniontown, PA 15401  
 Area Code 412 437-2801

**HAZLETON CAMPUS**

Highacres, Hazleton, PA 18201  
 Area Code 717 454-8731

**MILTON S. HERSHEY MEDICAL CENTER**

500 University Drive, Hershey, PA 17033  
 Area Code 717 534-8521

**McKEESPORT CAMPUS**

University Drive, McKeesport, PA 15132  
 Area Code 412 678-9501  
 Area Code 412 462-6401

**MONT ALTO CAMPUS**

Mont Alto, PA 17237  
 (Waynesboro) Area Code 717 749-3111

**NEW KENSINGTON CAMPUS**

3550 7th Street Road, New Kensington, PA 15068  
 Area Code 412 339-7561

**OGONTZ CAMPUS**

1600 Woodland Road, Abington, PA 19001  
 Area Code 215 886-9400

**\*\*RADNOR CENTER FOR GRADUATE STUDIES AND CONTINUING EDUCATION**

259 Radnor-Chester Road, Radnor, PA 19087  
 Area Code 215 293-9860

**SCHUYLKILL CAMPUS**

State Highway, Schuylkill Haven, PA 17972  
 Area Code 717 385-4500

**SHENANGO VALLEY CAMPUS**

147 Shenango Avenue, Sharon, PA 16146  
 Area Code 412 981-1640

**WILKES-BARRE CAMPUS**

P.O. Box 1830, Wilkes-Barre, PA 18708  
 Area Code 717 675-2171

**WORTHINGTON SCRANTON CAMPUS**

120 Ridge View Drive, Dunmore, PA 18512  
 Area Code 717 961-4757

**YORK CAMPUS**

1031 Edgecomb Avenue, York, PA 17403  
 Area Code 717 771-4586

\*Upper-division and graduate courses

\*\*Graduate courses



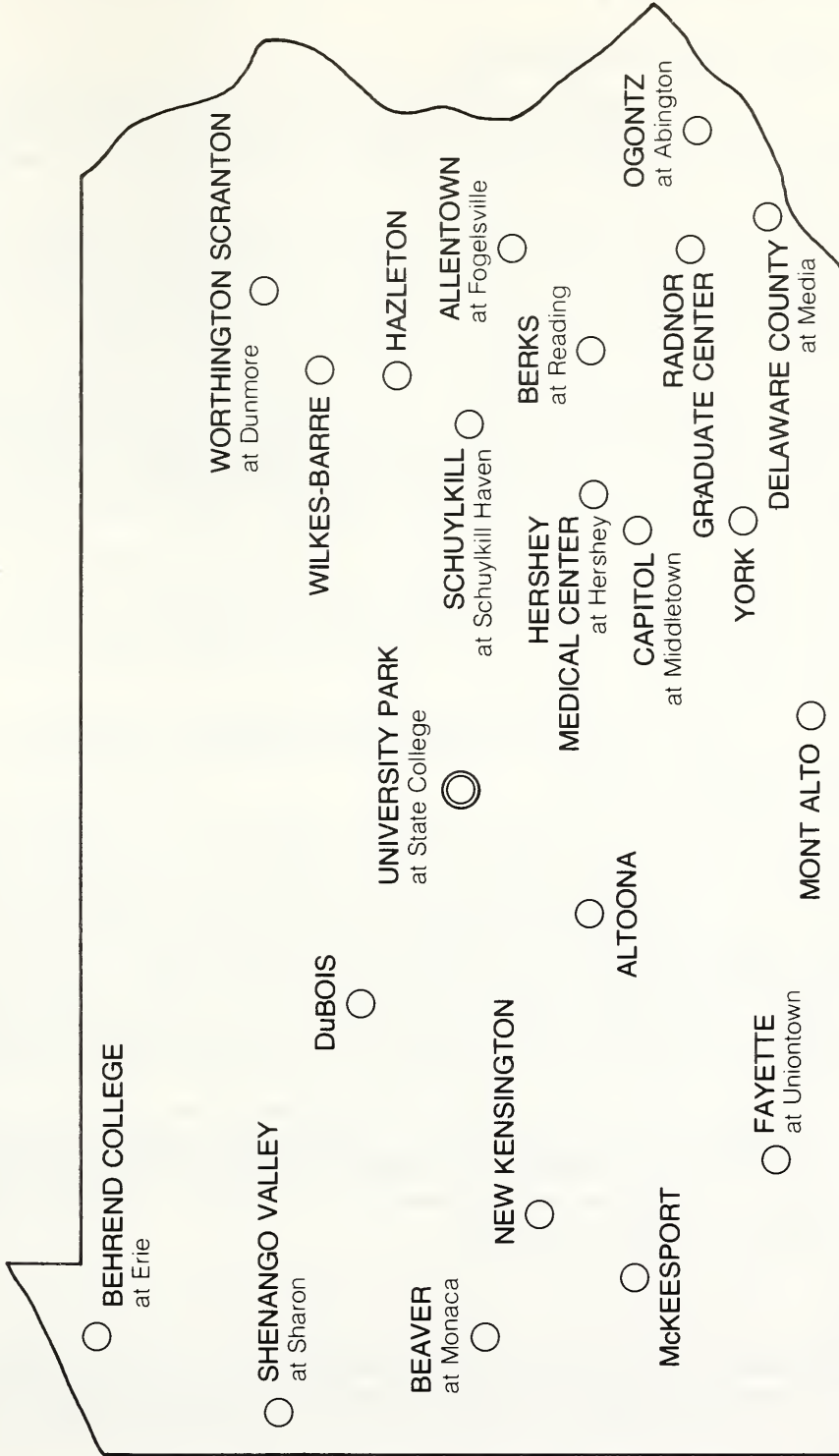
LOCATIONS																				ASSOCIATE DEGREE MAJORS
	ALTOONA	BEAVER	BEHREND COLLEGE	BERKS	DELAWARE COUNTY	DuBOIS	FAYETTE	HAZLETON	HERSHEY MEDICAL CENTER	McKEESPORT	MONT ALTO	NEW KENSINGTON	OGONTZ	SCHUYLKILL	SHENANGO VALLEY	UNIVERSITY PARK	WILKES-BARRE	WORTHINGTON SCRANTON	YORK	
	•	•	•	•	•	•	•	•		•	•	•	•	•	•		•	•	•	• Agricultural Business (1)
	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•	•	• Air Pollution Control Engr. Technology (2)
							•											•		• Architectural Engineering Technology
	•	•		•	•	•	•	•		•		•	•	•	•		•	•	•	• Biomedical Equipment Technology (3)
		•	•	•	•	•	•	•		•	•	•		•	•			•		• Business Administration
	•	•	•	•	•	•	•	•		•	•	•	•	•	•		•	•	•	• Chemical Engineering Technology (2)
				•	•		•		•											• Clinical Health Services+
																				• Community Services* (Administration of Justice)
	•	•								•		•		•				•	•	• Computer Science
	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•	•	• Electrical Engineering Technology
											•									• Forest Technology
																	•			• Highway Engineering Technology
				•																• Hotel and Food Service
				•	•													•		• Labor Studies*
	•	•	•	•	•	•	•	•		•	•	•		•	•		•	•	•	• Letters, Arts, and Sciences*
					•												•			• Mass Communications — Broadcasting
																				• Mass Communications — Journalism
	•	•	•	•		•	•	•		•		•	•		•		•	•	•	• Mechanical Engineering Technology (Drafting and Design Technology)
								•				•								• Medical Laboratory Technology (5)
															•					• Metallurgical Engineering Technology
	•					•	•	•				•		•			•	•	•	• Mining Technology (6)
	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•	•	• Nuclear Engineering Technology (7)
								•												• Physical Therapist Assistance (9)
											•						•			• Railway Engineering Technology (4)
												•	•							• Recreation and Parks
	•																			• Retailing
	•	•				•				•		•			•					• Science
												•								• Science — Radiologic Technologist Radiographer Option
						•		•							•	•				• Sociology*
							•								•			•		• Solar Heating and Cooling Technology (8)
											•						•			• Surveying Technology
	•	•		•	•	•	•	•		•		•	•	•	•		•	•	•	• Telecommunications Technology (4)
					•															• Wildlife Technology

- (1) Second year offered only at University Park
- (2) Second year offered only at Berks
- (3) Second year offered only at New Kensington and Wilkes-Barre
- (4) Second year offered only at Wilkes-Barre
- (5) Begins summer term at Hazleton and New Kensington
- (6) Second year offered only at Altoona, Fayette, and New Kensington
- (7) Second year offered only at Altoona and Hazleton
- (8) Second year offered only at Fayette
- (9) Begins summer term at Hazleton

\*Community Services (Administration of Justice), Labor Studies, and Sociology are offered as *extended degree* programs for students wishing to pursue part-time (day or evening) study. Letters, Arts, and Sciences also may be taken as an extended degree program at all University locations. Interested students should write to the Admissions Office or the nearest two-year campus to request a special application form for extended degree programs.

+ This program has special admission requirements including 60 undergraduate credits from a regionally approved college or university or equivalent. Therefore, this program is not open to freshman applicants.

PENN STATE'S CAMPUS SYSTEM



# THE UNIVERSITY

## MISSION OF THE UNIVERSITY

Penn State's fundamental responsibility is to provide programs of instruction, research, and public service, and thus act as an instrument of self-renewal and development for the Commonwealth. As Pennsylvania's land-grant university, Penn State must preserve and enhance its distinctive qualities.

While the modern university maintains links to the past and serves to maintain cultural values, its most extensive task at present is to help people to understand the great changes taking place in our society. People must have the skills and the learning habits that will make it possible for them to educate themselves over a lifetime. The rapid rate of change in contemporary society dictates that the University's programs adjust without undue delay to meet the needs of students and society.

University programs of research and other creative and scholarly activities are essential if the University is to contribute to the solution of the social, scientific, and technical problems of society and discharge effectively its upper-division and graduate teaching responsibilities. The University must also serve the Commonwealth directly through its programs of extension, continuing education, and other public service programs designed to meet the needs of citizens throughout the state.

By encouraging the enrollment of students from all segments of society and from other states and nations, the University provides the intellectual arena in which the search for rational solutions to societal problems can be nurtured, and in which teaching and learning can be the pivotal function. In performing this function, it is essential that the University foster independent thought and open discussion of alternatives.

## RESIDENT EDUCATION

The undergraduate degree programs of the University provide students with opportunities to increase their knowledge and understanding of the world, and to grow in their individual skills and capabilities for learning, analyzing, judging, creating, and communicating. All undergraduate degree programs and courses offered by the colleges of the University are under the academic sponsorship of a faculty committed to scholarship and are implemented under the academic policies and student rules established by the University Faculty Senate. They are intended to be flexible in accommodating students interested in learning, whether through traditional or non-traditional offerings, while enrolled on either a part-time or a full-time basis. The degree programs and courses of the colleges are offered through University administrative arrangements identified as Resident Education and Continuing Education.

The primary mission of Resident Education is to provide credit courses to degree candidates on University campuses as well as to administer certain off-campus credit-granting activities such as internships, practicums, field trips, and foreign studies. Students not formally admitted to degree candidacy (including provisional and nondegree students) may participate in Resident Education offerings as time and space permit.

## HISTORY

THE PENNSYLVANIA STATE UNIVERSITY, chartered by the Pennsylvania legislature as the Farmers' High School in 1855, was founded by professional men, educated farmers, and state and county agricultural leaders. A faculty of 4 met the incoming class of 69 students in February 1859.

In May 1862 the institution was renamed the Agriculture College of Pennsylvania, a name which recognized that its work was of collegiate level. Two months later, on July 2, President Abraham Lincoln signed the Morrill Land Grant Act offering each state free public land which it could sell to endow institutions of higher learning where "the leading object shall be, . . . to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

On April 1, 1863, the state legislature declared that the Morrill Act "is hereby accepted by the



State of Pennsylvania with all its provisions and conditions and the faith of the State is hereby pledged to carry the same into effect." The legislature then designated Penn State as the land-grant college of the Commonwealth.

The College broadened the scope of its instruction, began to admit women students, increase its enrollment, and enlarge its physical plant. Graduate work was offered as early as 1862. In 1874 the College was renamed the Pennsylvania State College.

In 1953 the name was changed again—to The Pennsylvania State University—in formal recognition of what Penn State had long since become, one of the country's leading universities. Its ten undergraduate colleges now offer 123 baccalaureate and 31 associate degree majors. In addition, Behrend College, in Erie, offers 15 complete baccalaureate programs. The Capitol Campus, near Harrisburg, offers 13 baccalaureate degree majors. Graduate students may choose from 128 approved fields of study. The College of Medicine, at The Milton S. Hershey Medical Center in Hershey, offers the M.D. degree, the M.S. and Ph.D. in anatomy, biological chemistry, genetics, microbiology, pharmacology, and physiology, the M.S. degree in laboratory animal medicine, and the associate degree in Clinical Health Services.

The original student body of 69 has grown to 63,800, the faculty of 4 to 3,553. Beginning with an educational program which offered 40 courses, Penn State today offers 4,928 undergraduate and 2,157 graduate courses. The University, whose prime purpose has always been to serve the people and the interests of the Commonwealth and the nation, is accredited by the Middle States Association and is a member of the Association of American Universities.

## ACADEMIC ORGANIZATION OF THE UNIVERSITY

### THE COLLEGES

The University has ten colleges that offer undergraduate majors leading to baccalaureate and associate degrees: College of Agriculture, College of Arts and Architecture, College of Business Administration, College of Earth and Mineral Sciences, College of Education, College of Engineering, College of Health, Physical Education, and Recreation, College of Human Development, College of the Liberal Arts, and College of Science. In addition, Capitol Campus at Middletown and Behrend College at Erie provide an alternative educational setting in which students may enroll in selected degree programs.

### THE UNIVERSITY SYSTEM OF COMMONWEALTH CAMPUSES

In addition to the University Park Campus in the municipality of State College, Behrend College in Erie, and Capitol Campus in Middletown, full-time instruction is available at seventeen Commonwealth Campuses: Allentown, Altoona, Beaver (Monaca), Berks (Reading), Delaware County (Media), DuBois, Fayette (Uniontown), Hazleton, McKeesport, Mont Alto, New Kensington, Ogontz (Abington), Schuylkill (Schuylkill Haven), Worthington Scranton (Dunmore), Shenango Valley (Sharon), Wilkes-Barre, and York.



## TWO-YEAR ASSOCIATE DEGREE MAJORS

The two-year associate degree majors provide concentrated instruction to prepare graduates for specialized assignments in business and industry or to give students a basic two-year education. These majors are offered at Commonwealth Campus locations and Behrend College as listed on page 8 of this bulletin. The Commonwealth Campuses also offer up to two years of work in most of the four-year baccalaureate degree majors offered by the University.

Thirty-two associate degree programs lead to either the Associate in Arts degree, the Associate in Engineering degree, or the Associate in Science degree. The majors leading to these degrees are listed below.

### *Associate in Arts Degree*

Labor Studies  
Letters, Arts, and Sciences  
Mass Communications—Broadcasting  
Mass Communications—Journalism  
Sociology

### *Associate in Engineering Degree*

Air Pollution Control Engineering Technology  
Architectural Engineering Technology  
Biomedical Equipment Technology  
Chemical Engineering Technology  
Electrical Engineering Technology  
Highway Engineering Technology  
Mechanical Engineering Technology  
Metallurgical Engineering Technology  
Mining Technology  
Nuclear Engineering Technology  
Railway Engineering Technology  
Solar Heating and Cooling Technology  
Surveying Technology  
Telecommunications Technology

### *Associate in Science Degree*

Agricultural Business  
Business Administration  
Clinical Health Services  
Community Services  
Computer Science  
Forest Technology  
Hotel and Food Service  
Medical Laboratory Technology  
Physical Therapist Assistance  
Recreation and Parks  
Retailing  
Science  
Wildlife Technology

A description of the purposes, objectives, and content of each of the two-year majors is given on succeeding pages.

Most of Penn State's associate degree enrollment at present is concentrated in its engineering technology majors. The engineering technology graduate, a specialist in applied rather than theoretical engineering, is equipped to translate creative ideas into new machines, products, structures, and processes. He or she understands the basic scientific principles which are the tools of the graduate engineer and is acquainted with the production tools and materials of this skilled worker.

**STATEMENT OF BASIC ACADEMIC ADMISSIONS POLICIES**—Admission to the University credit courses or degree candidacy at The Pennsylvania State University is governed by policies established by the University Faculty Senate. Although specific applications of these policies may vary from year to year, from location to location, and from program to program, all University admissions are governed by the following general policies:

1. As an institution of higher education, The Pennsylvania State University is committed to making post-high school education available to all who possess a high school diploma or its equivalent without restriction as to race, sex, religion, color, ancestry, national origin, ethnic origin, or handicap or age as provided by law.
2. The primary responsibility of the University is to residents of the Commonwealth of Pennsylvania. Consequently, within limits expressed from time to time by the Board of Trustees of the University, preference shall be given to Pennsylvania residents in the various admission processes.
3. In order to meet the variety of goals and objectives of the population, the spectrum of offerings is designed to enable persons with a variety of objectives — both degree and

nondegree — to receive higher education. Although access to educational opportunities of the University is open to all, courses offered for credit are available to those holding a high school diploma or its equivalent. Policies governing admission to degree candidacy are established by the University Faculty Senate (with delegation of policies governing admissions to graduate programs to the Graduate Faculty of the University) under a general policy of offering admissions to those whose past academic performance indicates a reasonable probability of success.

4. Undergraduate students are admitted to either baccalaureate degree candidacy or associate degree candidacy. To be admitted to degree candidacy, the individual must present an academic performance record which indicates a reasonable probability of his or her success in his or her chosen program. In the case of freshman admission to undergraduate degree candidacy, performance is measured through the high school record and standardized test results. In the case of advanced standing admission, performance is measured either through success in nondegree programs and courses of the University or by success at some other institution of higher education.
5. Within the space available in particular programs and at particular locations, admissions shall be offered preferentially to those whose performance record indicates the highest probability of success in the chosen program—with this process continuing until all available spaces are filled. Although exceptions to this policy may be made from time to time (for example, recipients of scholarships with restricting qualifications), these exceptions may be made only for students who meet at least the minimum admission and entrance requirements.

6. If a college requires restrictions on its baccalaureate admissions, the priorities or quotas established must include provisions to consider qualified students in each of these groups:

Admissions Group I—Freshman Admissions: Students who hold a high school diploma or equivalent, who present fewer than 18 credits of baccalaureate work (from The Pennsylvania State University or another accredited institution), who meet minimum college entrance requirements, and who meet minimum college admission standards are considered in this group.

Admissions Group II—Penn State Advanced Standing Admissions: Students who (1) request baccalaureate degree readmission, presenting 18 or more credits; (2) request a change from The Pennsylvania State University associate degree to baccalaureate degree status, presenting 18 or more applicable credits (including Type II, The Pennsylvania State University associate degree graduates); or (3) request a change from The Pennsylvania State University provisional degree to baccalaureate degree status, presenting 18 or more applicable credits, are considered in this group. In all Penn State advanced standing admissions, it is understood that the student must have a G.P.A. of at least 2.00 and meet the minimum entrance and advanced standing requirements of the college.

Admissions Group III—Other Advanced Standing Admissions: Students who (1) request changes from The Pennsylvania State University nondegree to baccalaureate degree status, presenting 18 or more applicable credits; or (2) have not been students at Penn State and request baccalaureate degree status at Penn State, presenting 18 or more applicable credits. In all advanced standing admissions it is understood that the student must have a G.P.A. of 2.00 and meet the minimum entrance and advanced standing requirements of the college.

Within these three groups, no special consideration will be given to any group; students will be admitted to the college on the basis of academic competition (e.g., SAT scores, grade-point averages, grades in required courses in the college, and other evidence predictive of baccalaureate degree performance where available, valid, and reliable).

7. To assure a proper educational mix of students and to further broaden the educational opportunities offered by the University, the University Faculty Senate and the University administration may from time to time authorize various specialized programs. These programs may permit students who do not meet the basic qualifications for admission to degree candidacy to be admitted to such candidacy. These programs may also permit, in selected situations, exceptional students who have not earned a high school diploma or its equivalent to enroll in University credit courses. Such specialized programs may include up to 10 percent of the total admission group for the University in any one year and up to a maximum of 15 percent of the admission to any geographic location of the University.



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8. Within this general policy, colleges of the University, with the concurrence of the University Faculty Senate, may impose certain educational background requirements (Carnegie Units) which must be completed by an individual before being admitted to degree candidacy.

**ADMISSION REQUIREMENTS—*Freshman Admission***—A person who holds a high school diploma or its equivalent, and who has not taken credit courses at an institution of higher learning, or a person who holds a high school diploma or its equivalent and who has taken less than 18 semester credits at an accredited college or university may be considered for admission as a freshman.

Applicants for admission to all associate degree programs must submit scores of the Scholastic Aptitude Test of the College Entrance Examination Board.

All applications should be addressed to the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802. Telephone: (814) 865-5471.

The University reserves the right to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

An applicant must state in writing whether he or she has attended any other institution of higher learning, even though advanced standing is not desired. Failure to indicate, at the time of registration, previous registration in another institution invalidates the admission.

To be admitted to degree candidacy, the applicant must have completed certain educational background requirements, called Carnegie Units or secondary school units. To determine whether you have the appropriate secondary school units required for your choice of a program of study, refer to page 17 to the program of your choice. Then read across to determine the necessary units.

***Basic Skills***—All students entering an associate degree program are tested for basic skills in English composition, reading, and mathematics (arithmetic).

Students identified with major weaknesses in English composition are required to enroll in English 4 (3 credits) prior to scheduling English 10. Students with reading and/or mathematics (arithmetic) weaknesses are encouraged to strengthen these skills through other available University resources.

Students are encouraged through the Basic Skills Program to overcome possible difficulties early in their college careers to ensure greater success with their academic studies.

***Admission with Advanced Standing***—An applicant who has attempted at least 18 semester credits at an accredited college or university and has a minimum cumulative grade-point average of at least 2.00 (on a 4.00 scale) for all graded courses at all colleges and universities previously attended may be considered for admission with advanced standing.

In all cases where work has been taken at other institutions, an official transcript from each place of attendance must be submitted directly to the Undergraduate Admissions Office by the institutions attended. The latter must include evidence that the student was honorably dismissed and was in good academic standing at the time of leaving.

Advanced standing credits may be awarded for work taken at fully accredited institutions provided the grade earned is equivalent to a grade of A, B, or C at this University, and the credits are useful to the student's program of study. In certain circumstances, the University may need to restrict advanced standing admissions in particular programs because of space limitations.

Associate degree programs have a limit on the number of credits that may be accepted by transfer from accredited institutions. Information on credit limitations may be obtained from the academic official responsible for a particular program.

Credits are transferred, but grades and grade points are not. Advanced standing students enter the University without an average, and their average begins with the completion of their first term of study at Penn State.

***Provisional Student (Degree-Seeking)***—An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admission as a degree candidate may enroll in credit courses at the University. A provisional student must

apply to enroll in courses every term. A provisional student may enroll in credit courses if the following criteria are met:

1. The student is making satisfactory progress toward admission as a degree candidate. Progress is satisfactory if a student has earned 18 credits with a minimum grade-point average of 2.00 (on a 4.00 scale). If a student attempted 18 credits and earned less than 2.00, the student is given a warning. A student who has earned 27 credits with a grade-point average of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent term. No student, regardless of cumulative grade-point average, who has completed 36 credits will be permitted to enroll as a provisional student in any subsequent term.
2. There is space available after degree candidates have been accommodated.
3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons may petition for an exception to the policy.

A provisional student may apply to become an associate degree candidate after completing 9 credits of Penn State course work with a minimum grade-point average of 2.00. All these credits must be earned at this university. The applicant must also satisfy the entrance requirements of either the major in which enrollment is desired or of the Division of Undergraduate Studies if the student wishes to enroll in that division. An applicant who has completed at least the equivalent to one year's associate degree work before applying for admission as an associate degree candidate must have the approval of either the dean of the college in which enrollment is desired or of the director of the Division of Undergraduate Studies if the student wishes to enroll in that division. After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a provisional student may be used to fulfill the degree requirements.

*Nondegree Student*—An applicant holding a high school diploma or its equivalent may be permitted to enroll in credit courses (either for credit or audit) at the University. A nondegree student who has not been dropped as a degree or provisional student from the University or any other college or university for poor scholarship may take at least 8 credits per term. A person dropped as a degree candidate from this University or any other college or university for poor scholarship may take courses as a nondegree student to improve a grade-point average in order to apply for reinstatement and/or admission or readmission as a degree candidate at the University. However, a student so dropped may not register as a nondegree student until one term (excluding summer term) has elapsed from the time of the drop action. Such students may register for 6 credits per term (8 credits at Capitol Campus) until degree status is attained.

A nondegree student may apply to enroll in courses each term if the following criteria are met:

1. The applicant has completed the prerequisites for the courses to be taken or can present evidence of ability to follow successfully the courses to be taken.
2. There is space available after degree candidates and provisional students have been accommodated.
3. The student has not been dismissed or suspended for nonacademic reasons from any college or university. However, a person who has been dismissed or suspended from another college or university for disciplinary reasons may petition for an exception to the policy.

A nondegree student may apply to become an associate degree candidate after completing 9 credits of Penn State course work with a minimum grade-point average of 2.00. All of these credits must be earned at this university. The applicant must also satisfy the entrance requirements of either the major in which enrollment is desired or of the Division of Undergraduate Studies if the student wishes to enroll in that division. An applicant who has completed at least the equivalent to one year's associate degree work before applying for admission as an associate degree candidate must have the approval of either the dean of the college in which enrollment is desired or of the director of the Division of Undergraduate Studies if the student wishes to enroll in that division. After a student is admitted as a degree candidate, the dean of the college of



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enrollment decides which credits earned as a nondegree student may be used to fulfill degree requirements.

Note: Provisional students (degree-seeking) and nondegree students are subject to the same tuition charges as regular students. The Academic Policies and Procedures approved by the University Faculty Senate apply to provisional and nondegree students as stated.

An individual desiring to take associate degree courses as a provisional student (degree-seeking) or nondegree student should submit the appropriate application for admission. An application form may be obtained from the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802, or from the office of the director of any Commonwealth Campus of The Pennsylvania State University.

DIVISION OF UNDERGRADUATE STUDIES—This division is an academic unit of the University which offers at the Commonwealth Campuses, Behrend College, and University Park the following programs and services:

*Freshman Testing, Counseling, and Advising*—All new freshmen admitted to the University are provided comprehensive testing, counseling, and program planning prior to attending first-term classes. The purpose of the program is to provide all new students with assistance in evaluating their educational plans and objectives.

*Enrollment*—New freshmen who prefer to test their abilities and interests or who wish to explore several areas of study before identifying themselves with one of the University’s colleges can request to begin their studies in the Division of Undergraduate Studies. At any time in their academic careers, students whose interests or career objectives change can request that they be enrolled in 2-DUS (Division of Undergraduate Studies). Specialized academic advising in DUS accompanies students’ attendance in regular courses until students choose a new program and meet its academic standards for transfer.

*Advising and Counseling*—All students, whether or not they are enrolled in the Division of Undergraduate Studies, have available to them the professional advising, counseling, and referral services provided by the division. Such services are a supplement to and are coordinated with the advisory services of the colleges and faculty. Provisional students aspiring for degree programs are also served by this unit.

*Undergraduate Academic Information*—The Division of Undergraduate Studies provides a comprehensive academic information support system throughout the University to assist faculty in their student advisory responsibilities.

GRADING SYSTEM—Grades shall be reported by the following symbols: A, B, C, D, and F.

<i>Grade</i>	<i>Quality of Performance</i>	<i>Grade-Point Equivalent</i>
A	Excellent	4
B	Good	3
C	Satisfactory	2
D	Poor	1
F	Failure	0

GRADUATION REQUIREMENTS—In order to graduate, a student must complete the course requirements of the major and earn at least a C average (a grade-point average of 2.00) for all courses.

DEGREES—The associate degree majors outlined in this catalog lead to the following degrees: Associate in Arts, Associate in Engineering, and Associate in Science.

## SECONDARY SCHOOL UNITS REQUIRED FOR ADMISSION TO ASSOCIATE DEGREE PROGRAMS

	English	Math. (A)*	Math. (B) +	Math. (C)**	Science	Other Subjects	Total
Agricultural Business	3					12	15
Air Pollution Control Engineering Technology	3	2				10	15
Architectural Engineering Technology	3	2				10	15
Biomedical Equipment Technology	3	2				10	15
Business Administration (2-year)	3		2			10	15
Chemical Engineering Technology	3	2				10	15
Clinical Health Services	3			2	2 + +	8	15
Community Services (Administration of Justice)	3					12	15
Computer Science	3	2				10	15
Electrical Engineering Technology	3	2				10	15
Forest Technology	3		2			10	15
Highway Engineering Technology	3	2				10	15
Hotel and Food Service	3					12	15
Labor Studies	3					12	15
Letters, Arts, and Sciences	3					12	15
Mass Communications-Broadcasting	3					12	15
Mass Communications-Journalism	3					12	15
Mechanical Engineering Technology (Drafting and Design Technology)	3	2				10	15
Medical Laboratory Technology	3	2			2 + +	8	15
Metallurgical Engineering Technology	3	2				10	15
Mining Technology	3	2				10	15
Nuclear Engineering Technology	3	2				10	15
Physical Therapist Assistance	3		1‡		1#	10	15
Railway Engineering Technology	3	2				10	15
Recreation and Parks	3					12	15
Retailing	3					12	15
Science (2-year)	3	2				10	15
Radiologic Technologist Radiographer	3	2				10	15
Sociology (2-year)	3					12	15
Solar Heating and Cooling Technology	3	2				10	15
Surveying Technology	3	2				10	15
Telecommunications Technology	3	2				10	15
Wildlife Technology	3		2			10	15

\*Math. (A) requirements may be satisfied by at least 2 units of mathematics: 1 unit of algebra, and 1 additional unit in any combination of advanced algebra, plane geometry, solid geometry, or trigonometry.

+ Math. (B) requirements may be satisfied by any 2 units of mathematics, but it is strongly recommended that the 2 units be 1 of algebra and 1 of plane geometry.

\*\*Math. (C) requirements may be satisfied by 1 unit of algebra and 1 additional unit in mathematics.

+ + Biology and chemistry are recommended.

‡The one unit of mathematics should be in algebra. It is strongly recommended that one additional unit of mathematics be completed.

#The one unit of science should be in biology. It is strongly recommended that one additional unit of science be completed.

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**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE UNIVERSITY PARK CAMPUS**—Credits received for 800-series courses may be applicable to a particular baccalaureate degree program listed in the current baccalaureate degree bulletin of The Pennsylvania State University at the discretion of the appropriate college and major department.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE CAPITOL CAMPUS**—In addition to receiving an education to prepare for employment, the graduate of an associate degree program may also qualify for admission to various programs leading to a baccalaureate degree from Penn State's Capitol Campus. Those anticipating admission to Capitol Campus should inquire at the Capitol Campus Admissions Office late in their freshman year or early in their sophomore year concerning baccalaureate program course requirements.

The following associate programs, with electives in English composition and college algebra, are acceptable toward the baccalaureate degree in Business Administration offered at Capitol Campus: Agricultural Business, Business Administration, Computer Science, Hotel and Food Service, Manufacturing Technology, Medical Laboratory Technology, Retailing, and all of the Engineering Technology majors.

Graduates of the associate programs of Air Pollution Control Engineering Technology, Architectural Engineering Technology, Biomedical Equipment Technology, Chemical Engineering Technology, Electrical Engineering Technology, Highway Engineering Technology, Mechanical Engineering Technology, Solar Heating and Cooling Technology, Surveying Technology, and Telecommunications Technology may wish to consider continuing at the Capitol Campus in a program of study in engineering technology leading to a Bachelor of Technology degree in Building Construction Technology, Electrical Design Engineering Technology, Energy Technology, Mechanical Design Engineering Technology, Transportation Technology, and Water Resources Engineering Technology.

The following associate degrees are also acceptable toward admission to programs leading to a baccalaureate degree at Capitol Campus: Letters, Arts, and Sciences; Mass Communications-Broadcasting; Mass Communications-Journalism; and Sociology.

## STUDENT WELFARE

**ORIENTATION PROGRAM**—At the opening of the fall term all new students participate in an orientation program. In addition to becoming acquainted with the new environment in which they will live and study, students receive instruction and counseling concerning their courses of study, participation in extracurricular activities, and the cultural opportunities open to them. Registration is also held during this period.

**STUDENT GOVERNMENT**—Representative student leadership is provided on each campus of the University by a student government association which functions through officers and representatives elected from and by the student body. In addition to their involvement in student programs at their local campuses, student officers and delegates from University campuses convene several times annually. These meetings provide for an exchange of information among the various student government associations and for system-wide coordination in student government and student activities.

**STUDENT CONDUCT**—The University regards as serious offenses all acts of unethical, immoral, dishonest, or destructive behavior, as well as violations of University regulations as set forth in each campus's student handbook and in the *Policies and Rules for Students*, a copy of which is available to each student upon registration.



**INSURANCE PROTECTION WHILE ATTENDING THE UNIVERSITY**—Any student who desires insurance protection while in attendance at the University (1) for accident and health and/or (2) for loss of property by fire or theft should arrange personally for whatever insurance seems desirable through an agency of his or her choice. Accident and health programs are available under the sponsorship of the Undergraduate or Graduate Student Government Organization.

**STUDENT ACCIDENT / TRIP INSURANCE**—Short-term group trip accident insurance is available to students who are not otherwise covered. Students taking course-connected class trips, or taking group trips with a student organization registered with the Office of Student Activities, may obtain around-the-clock coverage for accidental death and dismemberment, as well as accidental medical expenses. This insurance is available for the duration of the trip. Information about obtaining coverage and paying premiums is available from your instructor, campus business office, or the University risk manager.

**HEALTH SERVICES**—The University Health Service assists in promoting and maintaining the health of students.

Every new full-time student must successfully complete a physical examination before being permitted to register for classes at the University.

The health services of the University are made available to students in accordance with a statement provided by each campus, pertinent to that campus, and published in its student handbook.

The University does not obligate itself for payment of medical services other than those provided by personnel employed or retained by the University and in facilities owned or contracted for by the University. Treatment provided in contract facilities must be authorized by the campus director, dean of student affairs, or nurse.

Students are urged to protect themselves against medical expenses that may result from injury or illness by arranging for personal insurance coverage.

**CAREER DEVELOPMENT AND PLACEMENT**—The Career Development and Placement Center assists students in continual evaluation of their educational and career plans as they progress through college and helps them identify sources of personal or academic difficulty which may interfere with their progress. Individual as well as group educational and career counseling programs are available to students.

A Student Affairs staff member at each campus has responsibility for providing placement assistance for associate degree graduates. Services include bringing employers to the campus to interview graduates for permanent employment, providing job information, and assisting students in preparing for job interviewing. The Career Development and Placement Center at the University Park Campus supplies prospective employers (national, state, and local) with information concerning the associate degree programs and works cooperatively with the Commonwealth Campuses in assisting graduates to locate suitable employment.



# STUDENT AID

In addition to the student aid information provided below, students may wish to consult the admissions booklet “It Takes Two” sent to all applicants and the “Student Financial Aid” brochure available upon request. Additional questions should be directed to the Office of Student Aid, 335 Boucke Building, on the University Park Campus, or to the Office of Student Affairs at a Commonwealth Campus.

## AID PROGRAMS AVAILABLE TO ASSOCIATE DEGREE CANDIDATES

### GRANTS (aid sources not requiring repayment)

*Pell Grant* (formerly Basic Educational Opportunity Grant)—The Pell Grant is the major federal grant program available to undergraduates. This award is available to undergraduates pursuing their first baccalaureate or associate degree on at least a half-time basis (4 credits per term).

*Pennsylvania Higher Education Assistance Agency Grant (PHEAA)*—This is a grant established by the Commonwealth to assist undergraduates who have a financial need as defined by PHEAA guidelines. Applicants must be residents of Pennsylvania.

NOTE: Non-Pennsylvania students should contact their state higher education assistance agencies for information on state grants available for attending Penn State.

*Supplemental Educational Opportunity Grant (SEOG)*—This grant is available to undergraduates with high documented needs. It is normally awarded in combination with the College Work Study Program or the National Direct Student Loan.

### LOANS

*Guaranteed Student Loan Program (GSL)*—The GSL is a federally subsidized loan program which offers students attending on at least a half-time basis the opportunity to borrow money for their education. An undergraduate may borrow up to \$2,500 per year with a maximum of \$12,500 for undergraduate studies. Students from families with adjusted gross incomes of \$30,000 or more must file a needs analysis document to determine their financial need for Guaranteed Student Loan funds. Repayment begins six months after the termination of the student’s education at an interest rate of 9 percent per year simple interest.

*Auxiliary Loan to Assist Students*—This is an educational loan available to parents of dependent undergraduates, independent undergraduates, and graduate students. The interest rate is 14 percent, and repayment begins sixty days after the loan is disbursed.

*National Direct Student Loan (NDSL)*—This program provides loans of up to \$1,500 per year with an overall maximum of \$6,000 for undergraduates. Repayment starts six months after termination of the student’s education at an interest rate of 5 percent per year simple interest. Postponement of repayment and loan cancellation may be arranged for certain types of employment following graduation.

*University Loans*—University loans are funds established by donors to help students who have a documented financial need. These loans help needy students meet the educational and living expenses required to attain a college degree. Repayment starts immediately after the student completes his or her studies at a simple interest rate of 6 percent per year.

### EMPLOYMENT

*College Work Study Program (CWSP)*—The CWSP is a form of federal aid which allows a student to earn a portion of the documented financial need through approved CWSP jobs. This

is a nonrepayable source of aid since the student is paid an hourly wage for his or her employment.

*Student Employment*—Students who are interested in part-time employment on campus or in the State College area should contact the Student Employment Office, 301A Boucke Building, University Park, PA 16802, or contact the dean of student affairs at Commonwealth Campuses. Earnings from University employment must, according to federal regulations, be considered an aid resource which will be counted toward meeting a student's financial need.

## SCHOLARSHIPS

*University Scholarships*—University scholarships are awarded on the basis of superior high school or college academic performance and, in most cases, documented financial need. They are awarded either by the scholarship committees in the various academic colleges of Penn State, by the Freshman or Faculty Senate Scholarship Committee, or the Commonwealth Campus Scholarship Committees.

## HOW TO APPLY

After completing the application for admission to the University, each student seeking aid consideration should complete the forms necessary for each aid program being sought.

### I. Aid Awarded by the Federal Government

#### Pell Grant

(All undergraduate students)

Students who have completed the State Grant/Pell Grant application or the Financial Aid Form (FAF) are considered for the Pell Grant program. After receiving the Student Eligibility Report (SER), which designates eligibility for a Pell Grant, follow the instructions contained on the SER to finalize the award. Applications are available from high school guidance counselors, the Office of Student Aid, or the dean of student affairs at Commonwealth Campuses. They should be completed as soon after January 1 as possible. Transfer students must request a Financial Aid Transcript from each institution previously attended.

### II. Aid Awarded/Coordinated by the States

PHEAA Grant (Pennsylvania residents only)

Other state grant/scholarship programs

Guaranteed Student Loan

Auxiliary Loan to Assist Students

(Undergraduates)

Pennsylvania residents should complete the combined State Grant/Pell Grant application. Students currently receiving PHEAA grants will receive renewal applications by mail from the PHEAA agency. Regular applications are available from high school guidance counselors, the Office of Student Aid, and the dean of student affairs at Commonwealth Campuses in addition to the Pennsylvania Higher Education Assistance Agency. Applications should be completed as soon after January 1 as possible. Non-Pennsylvania students should contact their state's Higher Education Agency for information on aid programs available to them as Penn State students.

(PA and non-PA residents)

Contact a local bank or lending institution for application forms for the Guaranteed Student Loan Program and the Auxiliary Loan to Assist Students. After completing the forms, submit them to the Office of Student Aid, 335 Boucke Building, University Park, PA 16802, along with a stamped envelope addressed to the lender.

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### III. Aid Awarded by The Pennsylvania State University

Supplemental Educational Opportunity Grant (SEOG)  
National Direct Student Loan (NDSL)  
College Work Study Program (CWSP)  
University loans and scholarships

(All students)

Complete the State Grant/Pell Grant application or the Financial Aid Form (FAF).

Note: The State Grant/Pell Grant application or the FAF is the only form necessary for the entering freshman to complete to be considered for the above aid sources. Both forms are available from high school guidance counselors, the Office of Student Aid, or the dean of student affairs at Commonwealth Campuses. The recommended filing date for consideration is February 15; however, students are encouraged to submit applications as soon after January 1 as possible.

(All students except entering freshmen)

Complete the Office of Student Aid's Financial Aid Application. Students may indicate on this application the type of aid they are seeking, with the exception of University scholarships. File by April 1. The application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

(All students except entering freshmen)

Complete the University Scholarship Application. Since funds are limited, applications are only encouraged from those students with a cumulative grade-point average of 3.00 or higher. File by April 1. This application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

(Transfer students only)

Complete a Financial Aid Transcript. It is necessary for the University to know if you received aid at any other institution prior to enrolling at Penn State. Request this form from the Office of Student Aid.

### IV. Private Aid Sources

All students are urged to explore local scholarship/grant opportunities as well as any private low-interest loan funds offered by local employers and civic organizations.

## HOW MUCH DOES IT COST TO ATTEND PENN STATE?

One of the major concerns of students and their parents is knowing how much it will cost to attend Penn State for an academic year. The following itemized listing of expenses, although prepared for the 1981-82 academic year, may be used as a basic guide for your planning. Students may find that some of the costs vary according to individual needs and circumstances.



## STUDENT BUDGET — 1981-82

	<i>Residence Halls or Off-Campus Housing (All Campuses)</i>	<i>Living at Home</i>
Commonwealth Campus Tuition	\$1,593*	\$1,593*
Room & Board	2,037	1,100
Books & Supplies	288	288
Clothing & Laundry, Transportation, Personal Maintenance, Medical, & Recreation	1,743	2,206
Total*	\$5,661	\$5,187

\*For non-Pennsylvania residents the nonresident undergraduate tuition figure of \$3,711 should be substituted. The total estimated budget for an out-of-state undergraduate student at University Park Campus or a Commonwealth Campus is \$7,779.

The 1981-82 tuition at University Park is \$1,848. The tuition at Behrend College is \$1,677.

## STUDENT RIGHTS AND RESPONSIBILITIES

The Office of Student Aid at Penn State administers and coordinates the aid programs according to applicable federal and state regulations and University policies which guarantee each student equal access to financial assistance. The Office of Student Aid employs the standard need analysis services of the College Scholarship Service and the Pennsylvania Higher Education Assistance Agency to assess the aid eligibility of student applicants, ensuring equity of treatment among all applicants. The University does not discriminate on the basis of race, creed, color, national origin, handicap, age, or sex in any of its policies, practices, or procedures.

Eligibility for aid is contingent upon the student's financial need for assistance to meet educational costs. Each program has specific eligibility requirements which must be met before funds are awarded. In addition to financial need as a criterion for receiving aid, a student must be enrolling as a degree or provisional student. Nondegree students are not eligible to receive aid at Penn State. The University may require an official copy of the Federal Income Tax Form 1040 to verify eligibility for aid.

Satisfactory academic progress must be maintained for continued consideration for assistance. Although satisfactory progress is generally measured by institutional standards, certain aid programs have additional expectations which must be met for continued support. The student is encouraged to read carefully all aid application materials for further information about maintaining eligibility.

The Office of Student Aid assumes that all aid applicants will keep apprised of all application deadlines pertaining to the aid sources they are seeking. Because limited funds are available, applications filed after the applicable deadline dates are considered only as funds permit. On-time applicants receive first consideration. Some aid programs have flexible application deadlines which permit students to receive consideration at most times during the year (for example, the GSL and Pell Grant programs). Current and prospective aid recipients are strongly encouraged to keep well informed of aid application procedures through aid publications, news media, and agencies providing aid information such as the Office of Student Aid at University Park and the Office of Student Affairs at Commonwealth Campuses.

Aid is never automatically awarded for subsequent years. Students must reapply each year for funds. Students who plan to attend the summer term must file separate applications to be considered for almost all aid programs. The major exceptions to this requirement are as follows:

1. Entering freshmen seeking aid awarded by the University (see "How to Apply" above) must file only the State Grant/Pell Grant application or the FAF to receive consideration for the summer term if they have been admitted to the University specifically to begin during the summer term; and
2. The Pell Grant program has no separate summer application and is generally awarded to students during the fall-winter-spring academic year. (Pell Grant recipients not attending



GENERAL INFORMATION

the entire fall-winter-spring year should contact the Office of Student Aid to determine if a summer payment is possible.)

One of the goals of the Office of Student Aid is to help financial aid recipients receive a financial aid package which will attempt to meet the student's documented financial need. The financial aid package can be composed of federal aid, state grant monies, private award sources, or any other source of funds available to the student, including earnings from University employment.

It is the responsibility of the Office of Student Aid, however, to assure the federal government that federal aid recipients will not be permitted to retain financial aid *exceeding* the students' need. Students should be aware that if the aid received is in excess of need, they will be notified of their responsibility to return the excess amount to the University.

TUITION, ROOM, BOARD,  
AND OTHER CHARGES

*NOTE: The University reserves the right to revise tuition, room, board, and other charges without further notice. Tuition and charges for baccalaureate and graduate programs are listed separately in the Baccalaureate Degree Programs, Graduate Degree Programs, and Capitol Campus bulletins. Penn State has four ten-week terms each year. Students normally attend three terms per year.*

TUITION—Tuition per term for associate degree students:

	<i>Pennsylvanians</i>	<i>Non-Pennsylvanians</i>
8 or more credits:		
University Park Campus	\$616	\$1,237
Commonwealth Campuses	531	1,237
Behrend College	559	1,237
7 or fewer credits:		
University Park Campus—rate per credit	77	155
Commonwealth Campuses—rate per credit	60	155
Behrend College—rate per credit	63	155

*Enrollment Charge*—All entering students who plan to enroll for 8 or more credits are required to pay a nonrefundable enrollment charge of \$52 upon acceptance of an offer of admission.

*General Deposit*—All full-time undergraduate students are required to make a general deposit of \$50 at the time of admission. This deposit will serve to safeguard the property and equipment used by students in their course of study. It will be retained until a student withdraws or is graduated.

The deposit, less any charges for equipment damages, losses, and forfeitures, will be refunded early in the subsequent term to the student who has withdrawn or been graduated. The refund will be made by check and mailed to the student's home address. If at any time the balance of the deposit falls below the minimum amount of \$15, the deposit must be replenished.

*Credit by Examination*—A charge of \$15 per credit is made for credit by examination. For evaluation of credits completed elsewhere a charge of \$20 is made for those applying for admission and a charge of \$3 for those who are already matriculated.

*Student Activities*—Student activities charges are determined by elected representatives of the student body, together with a faculty representative.

## TUITION, ROOM, BOARD, AND OTHER CHARGES

*Change of Schedule Charge*—Unless a change is necessitated by the University, a charge of \$6 is made for each change of schedule after the first five working days of a term.

*Late Registration Charge*—Unless the delay is unavoidable, \$10 is charged a student who fails to register on the appointed day.

*Other Expenses*—Books and supplies must be secured by the student. These vary from approximately \$75 per term, depending upon the program.

**TERMS OF PAYMENT**—Tuition and charges, including room and board, are due and payable in advance of each term at the Office of the Bursar, 103 Shields Building, University Park, PA 16802. Registration for courses may not be completed until tuition and charges are paid.

Approximately six weeks in advance of each term, the University will mail to each continuing and newly admitted student of record an estimated bill for tuition and, where applicable, residence hall charges. Payment by mail is encouraged before the established deadline. The receipt is returned to the student by mail and will permit registration for the designated number of credits. This receipt is likewise authorization to obtain, where applicable, the residence hall key and meal ticket. If checks tendered for payment of tuition and charges are not paid upon presentation to the maker's bank, the student will automatically incur the late payment fee of \$25, and the receipt previously mailed will be considered null and void.

Any student who does not fulfill payment of obligations by the deadline established may be charged the late payment fee of \$25. This charge for late payment also applies to unpaid student supplemental charges. Students whose accounts are delinquent for more than ten days are subject to suspension from the University.

The University reserves the right to withhold transcripts and services to any current or former student who has an unsatisfied financial obligation to the University.

**WITHDRAWALS AND REFUNDS**—In the event of withdrawal, charges for tuition will be refunded under the following policy:

Refund of 80 percent upon withdrawal before the end of the first week of the term (seventh consecutive calendar day from the first day of classes) and a decrease of 20 percent for each week thereafter up to and including the fourth consecutive calendar week. No amount will be refunded for withdrawal after the fourth consecutive calendar week of the term.

Students whose reduction in credits results in fewer than 8 credits will receive refunds of tuition for credits dropped on the basis of these policies.

Any refund policy related to adjustments in room and board will be a part of the housing contract.

# MAJORS

## GENERAL DEGREE REQUIREMENTS

There are a number of areas in which a certain level of competence is expected of all recipients of associate degrees. Therefore, all associate degree programs of the University demand the satisfactory completion of the following requirements:

- 3 credits in the social sciences
- 3 credits in the arts and humanities
- 3 credits in English
- 3 credits in speech communication
- 6 credits in the physical sciences, biological science, or mathematics
- 3 credits in general education electives\*

**RESERVATIONS**—The University reserves the right to make such program or class changes as may become necessary because of insufficient enrollment or other contingencies. The University also reserves the right to make any necessary changes in tuition and charges without prior notice. Courses and programs described and listed in this bulletin are also subject to change without notice.

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\*If the student has not had courses in all three areas of physical science, biological science, and mathematics either in high school or in his or her associate degree program, these three “general education” credits must be used to remedy this deficiency. Otherwise, they may be in any of the areas listed above.

# AGRICULTURAL BUSINESS

The Agricultural Business major prepares students for employment in commercial agriculture and businesses serving agriculture. Three options allow students to specialize in either crop or livestock production or in agricultural business, which provides training in management, business organization, and sales.

The first three terms are offered at selected Commonwealth Campuses where students fulfill basic course requirements in accounting, business, English, and natural and social sciences. The second year at the University Park Campus provides course work in livestock and crop production, management, and agricultural business. As part of the requirements, there are supporting courses in agricultural engineering, farm management, agricultural marketing and sales. Each option allows the student a choice of electives to satisfy special interests and needs.

To graduate, 66 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
Engl. 10, Composition and Rhetoric I	3	Biol. 111, Life Science	3
Chem. 11, Introductory Chemistry	3	Engl. 20, Composition and Rhetoric II; or selection	3
Social science selection	3	B.Law 243, Legal Environment of Business	3
	—	Arts/humanities selection	3
	9*		—
			12
THIRD TERM	Credits		
Acctg. 101, Introductory Financial Accounting	3		
Sp.Com. 200, Effective Speech	3		
Biol. 112, Botany	3		
	—		
	9*		

## General Option

FOURTH TERM	Credits	FIFTH TERM	Credits
Ag.Ec. 101, Introduction to Agricultural Economics; or Ag.Ec. 208, Farm Records and Accounts	3	Ag.Ec. 102, Introduction to Food and Agricultural Marketing; or Ag.Ec. 232, Marketing Dairy Products	3
Agricultural engineering selection	3	Agro. 28, Principles of Crop Management; or Plt.Sc. 200, Ecology of Plant Production	3
Agro. 200, Soil Resources and Land Use	3	Animal industry, dairy science, or poultry science selection	3
Mgmt. 100, Survey of Management; or Mktg. 120, Salesmanship	3	Agriculture or business selection	3
	—		—
	12		12
SIXTH TERM	Credits		
Ag.Ec. 106, Introduction to Farm Management; or Ag.Ec. 200, Introduction to Agricultural Business Management	3		
Ag.Ec. 297, Special Topics	3		
Animal industry, dairy science, or poultry science selection	3		
Elective	3		
	—		
	12		

\*A student may schedule up to 12 credits in these terms. If additional credits are scheduled, suggested courses are mathematics, economics, business management, or biological science.



## Animal Production Option

FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
Ag.Ec. 101, Introduction to Agricultural Economics;		Agricultural economics selection	3
Ag.Ec. 106, Introduction to Farm Management; or Ag.Ec. 208, Farm Records and Accounts	3	Agro. 28, Principles of Crop Management	3
Ag.E. 14, Farm Machinery and Tractors	3	A.I. 7, Horse Production and Management; or A.I. 205, Meat Animal Management	3
Agro. 200, Soil Resources and Land Use	3	Elective	3
A.I. 100, Animal Agriculture	3		—
	—		12
	12		

SIXTH TERM	<i>Credits</i>
Agricultural economics selection	3
Agricultural engineering selection	3
Pty.Sc. 201, Introduction to Poultry Management	1
Pty.Sc. 202, Commercial Poultry Practice	2
D.Sc. 205, Dairy Science and Industry	3
	—
	12

## Crop Production Option

FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
Ag.Ec. 101, Introduction to Agricultural Economics; or		Ag.Ec. 102, Introduction to Food and Agricultural Marketing	3
Ag.Ec. 106, Introduction to Farm Management; or Ag.Ec. 208, Farm Records and Accounts	3	Agro. 28, Principles of Crop Management	3
Ag.E. 14, Farm Machinery	3	Animal production or poultry science selection	3
Agro. 200, Soil Resources and Land Use	3	Horticulture selection	3
Elective	3		—
	—		12
	12		

SIXTH TERM	<i>Credits</i>
Ag.E. 1, Farm Utilities; or Ag.E. 4, Farm Buildings	3
Ent. 12, Economic Entomology	3
Electives	6
	—
	12

## AIR POLLUTION CONTROL ENGINEERING TECHNOLOGY

This major prepares students for positions as air pollution control technicians, working for a local, state, or federal agency. Technicians may be responsible for the calibration, installation, and operation of air sampling and monitoring equipment, investigation of complaints, plant inspections, and source evaluation. As an industrial air pollution control technician, these same responsibilities may be required with the addition of evaluation and monitoring of gas cleaning equipment and performance.

To graduate, 71-72 credits are required.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or		Cmp.Sc. 1, Basic Computer	
Engl. 10, Composition and		Programming	1
Rhetoric I	3	*Engl. 10, Composition and	
Engr. 2, Engineering Orientation	1	Rhetoric I; or Engl. 20,	
Math. 801, Technical Mathematics	3	Composition and Rhetoric II; or	
	—	Engl. 826, Report Writing	3
	12	Math. 802, Technical Mathematics	3
			—
			11
THIRD TERM		+ FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
Chem. 13, Chemical Principles	3	Chem. 23, Introduction to Modern	
Chem. 15, Experimental Chemistry	1	Analytical Chemistry	4
Math. 803, Technical Calculus	3	E.E. 801, Fundamentals of D.C.	
Sp.Com. 200, Effective Speech	3	Circuits	3
Social science selection	3	E.Mch. 810, Basic Mechanics, or	
	—	E.Mch. 811, Elementary	
	13	Mechanics	2-3
		Phys. 150, Technical Physics	3
			—
			12-13
FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
Ch.E. 802, Chemical Technology	3	E.E. 814, Electrical Circuits	4
Ch.E. 830, Industrial Chemistry	3	E.E. 818, Electrical Circuits	
E.E. 809, D.C. Circuits Laboratory	2	Laboratory	1
Humanities selection	3	M.E. 882, Air Resource	
	—	Management	2
	11	M.E. 884, Sampling and	
		Monitoring Program	2
		Meteo. 303, Introductory	
		Meteorology	3
			—
			12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

+ Second year to be taken at Berks Campus.

ARCHITECTURAL ENGINEERING TECHNOLOGY

This two-year program is designed to provide technically trained personnel between the level of high school graduate and professional architectural engineer or architect to support the architectural design and construction industries. Architectural engineering technicians work under the supervision of a graduate architect or architectural engineer. They translate sketches and design concepts into working drawings and renderings. To do so, they need basic skills in structural and environmental systems design and layout, knowledge of building materials and equipment characteristics and performance, as well as the training in drafting techniques required for the realization of final drawings.

The graduates of this major are prepared for employment in architectural, building engineering, or industrialized housing firms. To graduate, 71-72 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
A.E. 801, Building Materials	3	A.E. 802, Methods of Construction	3
E.G. 3, Architectural Graphics	2	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Math. 802, Technical Mathematics	3
Engr. 2, Engineering Orientation	1	Phys. 150, Technical Physics	3
Math. 801, Technical Mathematics	3		
	—		—
	12		12
THIRD TERM	Credits	FOURTH TERM	Credits
A.E. 803, Plumbing and Fire Protection	3	A.E. 804, Heating, Ventilating, and Air Conditioning Layout	3
E.Mch. 811, Elementary Mechanics	3	A.E. 814, Steel Construction	3
Math. 803, Technical Calculus	3	Cmp.Sc. 101, Introduction to Algorithmic Processes	3
Phys. 151, Technical Physics	3	Social science selection	3
	—		—
	12		12
FIFTH TERM	Credits	SIXTH TERM	Credits
A.E. 812, Building Lighting and Electrical Layout	3	A.E. 807, Advanced Construction Methods	3
A.E. 815, Concrete Construction	3	A.E. 810, Architectural Engineering Office Practice	3
Sp.Com. 200, Effective Speech	3	Humanities selection	3
Technical selection	2-3	Technical selection	3
	—		—
	11-12		12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

## BIOMEDICAL EQUIPMENT TECHNOLOGY

This major prepares students for careers as biomedical equipment technicians, men and women responsible for specifying, calibrating, maintaining, and replacing clinical electronic equipment used in patient care. Modern health care facilities now have complex electronic instrumentation and apparatus located in virtually every diagnostic and patient treatment area. While these innovations result in improved patient care, they also require extensive maintenance procedures, new equipment calibration, complex servicing and repair, as well as attention to patient and operator safety. To graduate, 75 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 5, Experimental Methods for Engineers; or if not available, Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		—
	12		11
THIRD TERM	Credits	FOURTH TERM	Credits
Cmp.Sc. 1, Basic Computer Programming	1	Biol. 41, Physiology	3
E.E. 814, Electrical Circuits	4	Chem. 11, Introductory Chemistry	3
E.E. 818, Electrical Circuits Laboratory	1	E.E. 807, A.C. and Electronics Laboratory	2
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3	E.E. 810, Fundamentals of Semiconductors	3
Math. 803, Technical Calculus	3		—
	12		11
FIFTH TERM	Credits	SIXTH TERM	Credits
B.E.T. 801, Physiological Transducers	3	B.E.T. 802, Biomedical Instrumentation and Systems	3
E.E. 816, Linear Electronic Circuits	3	B.E.T. 804, Medical and Clinical Equipment	3
E.E. 821, Linear Electronics Laboratory	1	Humanities selection	3
Sp.Com. 200, Effective Speech	3	Technical selection	3
Social science selection	3		—
	13		12
SEVENTH TERM (SUMMER)	Credits		
B.E.T. 803, Biomedical Equipment Laboratory (Internship)	4		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.



BUSINESS ADMINISTRATION

This two-year, college-level academic program is designed to provide instruction in business administration that fulfills the requirements of various levels of responsibility higher than that held by high school graduates.

The primary objective of this major is to provide a managerially oriented program with sufficient communicative and mathematical skills, socially relevant course work, and advanced courses in specific business specialties to develop a well-rounded graduate. To graduate, 68 credits are required.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	12
*Engl. 4, 10, 826; Sp.Com. 200	
B. Social sciences, humanities	9
History, humanities, political science, psychology, sociology selection	
C. Physical education	2
II. Requirements for the Major (45 credits)	
A. General	30
Econ. 2 or 4; Computer Science; Math. 5; Acctg. 801, 802; B.Law 243; Fin. 100; Mgmt. 100; Mktg. 121; Q.B.A. 101 or 801	
B. Specialization	15
Students will select five courses from the following list according to their area of specialization: Acctg. 803, 806, 807; B.A. 250, 803; B.Law 850; B.Log. 102, 104, 206; Cmp.Sc. 102, 140, 890; Econ. 2 or 4+; Fin. 108; Ins. 100, 800, 810, 820, 830; I.B. 862; L.S. 100; Mktg. 120, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810; Mgmt. 801, 802; Q.B.A. 102; R.Est. 100, 800, 810, 830	

\*Students will be placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students not required to take Engl. 4 will take Engl. 20.

+ Select the course not used to meet the General Education Requirements.

## CHEMICAL ENGINEERING TECHNOLOGY

This major prepares graduates for positions as assistants to chemists and chemical engineers, assistants in research and control laboratories, and trainees for future supervisory positions in manufacturing and production.

It provides the training necessary for such positions, including a reasonable proficiency in basic sciences, mathematics, communication skills, and the basic principles of chemical engineering technology.

To graduate, 71-72 credits are required.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3-4
E.G. 1, Engineering Drawing	2	Chem. 14, Experimental Chemistry	1
*Engl. 4, Basic Writing Skills; or		Cmp.Sc. 1, Basic Computer	
Engl. 10, Composition and		Programming	1
Rhetoric I	3	*Engl. 10, Composition and	
Engr. 2, Engineering Orientation	1	Rhetoric I; or Engl. 20,	
Math. 801, Technical Mathematics	3	Composition and Rhetoric II; or	
	—	Engl. 826, Report Writing	3
	12	Math. 802, Technical Mathematics	3
			—
			11-12
THIRD TERM		FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
Social science selection	3	Ch.E. 800, Technical Calculations	3
Chem. 13, Chemical Principles	3	Chem. 23, Introduction to Modern	
Chem. 15, Experimental Chemistry	1	Analytical Chemistry	4
Math. 803, Technical Calculus	3	Phys. 150, Technical Physics	3
Sp.Com. 200, Effective Speech	3	Humanities selection	3
	—		—
	13		13
FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
Ch.E. 802, Chemical Technology	3	Ch.E. 803, Chemical Technology	3
Chem. 34, Organic Chemistry	3	Ch.E. 820, Chemical Technology	
Phys. 151, Technical Physics	3	Laboratory	4
Ch.E. 830, Industrial Chemistry	3	Technical selection	3
	—		—
	12		10

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

CLINICAL HEALTH SERVICES

The objective of this program is to educate students to assist the primary care physician in providing health care to patients with a wide variety of medically related problems. The training for the physician's assistant consists of three ten-week terms in basic and clinical sciences, conducted at the Hershey Medical Center campus, and three ten-week terms in a primary care setting. The educational program prepares the physician's assistant to aid the primary-care physician in increasing the availability and quality of health care services.

Admission requirements include 60 undergraduate credits from a regionally approved college or university, or equivalent, including a 3-credit college-level course in each of the following: English composition, speech communication, and humanities. In addition, it is strongly recommended that students have completed courses in human anatomy and physiology and microbiology prior to matriculation.

For more information write to The Milton S. Hershey Medical Center, 500 University Drive, Hershey, PA 17033.

FIRST TERM	Credits	SECOND TERM	Credits
P.A. 800, Mechanisms of Body Function I	2	P.A. 801, Mechanisms of Body Function II	2
P.A. 805, Microbiology	2	P.A. 811, Human Behavior II	2
P.A. 810, Human Behavior I	2	P.A. 821, Patient-Oriented Care II	2
P.A. 820, Patient-Oriented Care I	1	P.A. 831, Medical/Surgical Problems II	2
P.A. 830, Medical/Surgical Problems I	2	P.A. 850, Therapeutics	2
P.A. 840, Diagnostics	1	P.A. 807, Human Genetics	1
	10		11

THIRD TERM	Credits	FOURTH TERM	Credits
Human. 101, Science and Human Values	3	P.A. 880, Practicum in Primary Health Care Delivery I	10
P.A. 802, Mechanisms of Body Function III	2		10
P.A. 822, Patient-Oriented Care III	2		
P.A. 832, Medical/Surgical Problems III	2		
P.A. 860, Emergency Medicine	2		
P.A. 879, Pediatrics	2		
	13		

FIFTH TERM	Credits	SIXTH TERM	Credits
P.A. 881, Practicum in Primary Health Care Delivery II	10	P.A. 882, Practicum in Primary Health Care Delivery III	10
	10		10

## COMMUNITY SERVICES

The Community Services major is designed to provide entry-level professional competency in one of several human service fields. The objectives of the Administration of Justice emphasis are to provide a general education background, a knowledge base in human development, and a core of professional skills.

The Administration of Justice emphasis educates and upgrades career personnel in police departments, probation and parole agencies, and correctional institutions. Challenges and problems in law enforcement, current approaches and alternatives for crime control, prevention, and rehabilitation are studied. The program includes one term of field experience in a local community agency. To graduate, 62 credits are required.

### *The Administration of Justice Emphasis*

	<i>Credits</i>
I. General Education Requirements (21 credits)	
A. Communication skills	
Engl. 10, 20; Sp.Com. 200	9
B. Biological and physical sciences	
A minimum of 3 credits in each area	6
C. Arts and humanities	3
D. Social and behavioral sciences	3
II. Requirements for the Major (41 credits)	
A. General requirements	
Adm.J. (Com.D.) 7, H.Dev. 100, I.F.S. 129	7
B. Requirements for Administration of Justice emphasis	34
Adm.J. 111 (3), 221 (3), 394* (1), 395* (8), 396* (1); plus 18 credits of professional electives selected in consultation with adviser.	

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\*Guidelines for Field Placement include:

1. Agencies utilized are local agencies.
2. Priority for placement is made for students with higher term standings.
3. Prerequisites for placement include Adm.J. (Com.D.) 7 and Adm.J. 111.



COMPUTER SCIENCE

The primary objective of this program is to prepare graduates for immediate and continuing employability as application programmers, associate systems designers, or associate systems programmers.

To meet this objective the program is designed to ensure a thorough knowledge of the techniques of programming general-purpose digital computers, and includes extensive practice—using contemporary programming technologies—in the analysis, organization, validation, and documentation of effective computer code. The program also includes practical knowledge of the logical organization of modern digital computers and related peripheral equipment, the structure of operating systems and compilers, and considerations in the design of information systems.

The General Education Requirements provide the student with an extension to the basic educational foundation. The General Requirements for the Major give the graduate technical competence in the computing and data processing field. The Application Specialization provides a practical knowledge of an area of application within which the graduate may profitably utilize the acquired computing talent. To graduate, 65 credits are required.

	<i>Scheduling Recommendation</i>	
	<i>by Term</i>	<i>Standing</i>
I. General Education Requirements (29 credits)	1-3	4-6
A. Communication skills (9 credits)		
English selections (6)	x	—
Sp.Com. 200 (3)	—	x
B. Mathematics and statistics (12 credits)		
Math. 17 (3), 18 (3)	x	—
Mathematics selection (3)	x	—
Quantitative business analysis or statistics selection (3)	—	x
C. Social science, arts, humanities (6 credits)		
Social science selection (3)	x	x
Arts and humanities selection (3)	x	x
D. Physical education (2 credits)		
Physical education selections	x	—
II. Requirements for the Major (36 credits)		
A. General (24)		
Cmp.Sc. 101, 102, 140 (9)	x	—
Cmp.Sc. 804 (2)	x	—
Cmp.Sc. 144, 154, 164 (10)	—	x
Cmp.Sc. 805 (3)	—	x
B. Application Specialization (12 credits)		
Related course work in an area of computer application. These courses may be chosen from areas such as accounting, retail operations, general business, mathematics, general science, environmental resources, etc., and are selected from the courses offered at the student's campus. Final course selection should be made in consultation with adviser.	x	x

## ELECTRICAL ENGINEERING TECHNOLOGY

This major is designed to prepare graduates for technological service with electrical utilities, manufacturers of electrical and electronic equipment, and electrical maintenance and instrument departments of various industrial concerns. The principal objective is to provide a practical knowledge of electrical machinery and its control, as well as of electronic theory and its application in communication and control systems.

To graduate, 74-75 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		—
	—		11
	12		

THIRD TERM	<i>Credits</i>	SUMMER TERM	<i>Credits</i>
Cmp.Sc. 1, Basic Computer Programming	1	E.E. 813, Fundamentals of Electrical Machines	3
E.E. 814, Electrical Circuits	4		
E.E. 818, Electrical Circuits Laboratory	1		
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3		
Math. 803, Technical Calculus	3		
	—		
	12		

FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
E.E. 804, A.C. Circuits	2	E.E. 815, A.C. Machinery and Control	3
E.E. 807, A.C. and Electronics Laboratory	2	E.E. 817, Advanced Electronics	4
E.E. 810, Fundamentals of Semiconductors	3	E.E. 819, A.C. Machinery Laboratory	1
E.Mch. 810, Basic Mechanics	2	E.E. 820, Advanced Electronics Laboratory	1
Social science selection	3	Sp.Com. 200, Effective Speech	3
	—		—
	12		12

SIXTH TERM	<i>Credits</i>
E.E. 811, Microprocessors	3
E.E. 816, Linear Electronic Circuits	3
E.E. 821, Linear Electronics Laboratory	1
Humanities selection	3
Technical selection	2-3
	—
	12-13

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

FOREST TECHNOLOGY

The objectives of this major are to train students in the techniques that are basic to planning, organizing, directing, and managing forestry enterprises and to provide a program of general studies which will serve as a foundation for future intellectual growth. It is intended that graduates will act in a supporting capacity to professional foresters.

To be eligible to receive the degree of Associate in Science, a student must have completed the prescribed major of 69 credits.

FIRST TERM	Credits	SECOND TERM	Credits
*Engl. 10, Composition and Rhetoric I	3	For. 806, Forest Inventories	3
For. 203, Dendrology	2	For. 815, Forest Surveying I	3
For. 804, Forest Mensuration	3	For. 825, Harvesting Techniques	1
For. 824, Introduction to Harvesting	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3		—
	—		10
	12		

THIRD TERM	Credits
For. 240, Silvicultural Practices	3
For. 816, Forest Surveying II	3
For. 826, Reforestation and Intermediate Operations	1
Humanities selection	3
	—
	10

FOURTH TERM	Credits	FIFTH TERM	Credits
For. 220, Forest Ecosystem Protection	3	For. 241, Aerial Photo Interpretation	4
+ For. 221, Forest Fire Technology	1	For. 809, Forest Valuation	3
For. 242, Elements of Project Supervision in Forestry	3	Sp.Com. 200, Effective Speech	3
¶For. 807, Forest Recreation	2	Social science selection	3
For. 814, Forestry Leadership Practicum	1		—
	—		13
	8-10		

SIXTH TERM	Credits	SUMMER TERM (Sophomores)	Credits
Acctg. 16, Introductory Accounting Survey	3	For. 820, Advanced Forest Measurements	1
Engl. 826, Report Writing	3	For. 821, Field Studies in Ecology	1
+ For. 807, Forest Recreation Practicum	1	For. 822, Forest Management Systems	1
¶For. 810, Forest Improvements	3	For. 827, Field Study Preparation	1
¶For. 817, Urban Forestry	3		—
	—		4
	10-13		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10.

+ Practicums which require the lecture course as a prerequisite.

¶Students must take two out of three of these courses.

## HIGHWAY ENGINEERING TECHNOLOGY

This major prepares highway construction technicians to perform many of the planning and design tasks necessary in the construction of highways, railroads, bridges, viaducts, and airfields. In the planning stages of construction a highway construction technician may be engaged in estimating costs, purchasing materials, preparing specifications, computing fills, cuts, drainage requirements, drafting, designing, or surveying. During actual construction, such technicians may perform supervisory functions and inspection.

To graduate, 73 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	E.Mch. 810, Basic Mechanics	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 150, Technical Physics	3
	<hr/> 12		<hr/> 13
THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
C.E. 812, Curves and Earthwork	3	C.E. 814, Photogrammetry	3
Cmp.Sc. 1, Basic Computer Programming	1	C.E. 818, Route Surveying	2
E.Mch. 813, Strength and Properties of Materials	3	*Engl. 826, Report Writing	3
Math. 803, Technical Calculus	3	Geosc. 1, Physical Geology	3
Phys. 151, Technical Physics	3		<hr/> 11
	<hr/> 13		
FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
C.E. 821, Concrete Technology	3	C.E. 824, Asphalt Technology	3
C.E. 822, Soil Mechanics	3	C.E. 825, Construction Estimating	3
C.E. 823, Highway Organization and Operations	3	Econ. 14, Principles of Economics	3
Human. 1, Values of the Western Cultural Heritage	3	Sp.Com. 200, Effective Speech	3
	<hr/> 12		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.



HOTEL AND FOOD SERVICE

This is an intensive six-term major designed to prepare students for responsible executive positions in the hospitality industry and in health facilities food service administration. The emphasis in Health Facilities Food Service Administration qualifies students as dietetic technicians. The course of study places heavy reliance on experience acquired in an on-the-job setting. To graduate, 68 credits are required.

Students who achieve outstanding records may, upon completing this program, apply for admission to the baccalaureate degree program in Food Service and Housing Administration in the College of Human Development. Nine additional terms of satisfactory work are required to earn the baccalaureate degree.

I. General Education Requirements (23 credits)	<i>Credits</i>
A. Communication skills	
6 credits in English, Sp.Com. 200	9
B. Arts, humanities, social and behavioral sciences	12
At least 3 credits in economics	
C. Physical Education	2
II. Requirements for the Major (45 credits)	
A. General	15
F.S.H.A. 225, 295; H.F.S. 850, 860; 3 credits in accounting	
B. Specialization	30
Students may select an emphasis in Hospitality Administration or Health Facilities Food Service Administration.	
Students emphasizing Hospitality Administration will be required to take F.S.H.A. 102, H.F.S. 804 and 870, plus 20 additional credits with the approval of their adviser. Students emphasizing Health Facilities Food Service Administration will be required to take F.S.H.A. 103, H.F.S. 875, Nutr. 351 and 800, plus 16 additional credits with the approval of their adviser.	

LABOR STUDIES

The purpose of this program is to help employees improve their understanding and competence in coping with personal, group, and organizational problems at their worksites, in relationships with employers, and in transactions with the community, the economy, and the polity. The program consists of a core of labor courses supplemented by introductory liberal arts studies which provide (1) basic communication skills, (2) conceptual tools of analysis, and (3) a more general cultural context for the examination of labor problems.

This major leads to the degree of Associate in Arts. To graduate, 60 credits are required.

I. General Education Requirements (21 credits)	Credits
A. Communication skills	
English selection, speech communication selection	6
B. Humanities, natural and social sciences	15
Biological science, humanities, mathematics, physical science, and social science selections	
II. Requirements for the Major (39 credits)	
A. General	
Econ. 14, Hist. 21, Pl.Sc. 1, Psy. 2, Soc. 1	15
Management selection, speech selection	6
B. Labor Studies	18
L.S. 100*, 102, 103, 104, 156, 296	
	—
	60

\*Will be accepted toward the baccalaureate major in Labor Studies.

## LETTERS, ARTS, AND SCIENCES\*

The objectives of this program are to broaden the student's understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student's interests or career plans. This program is a complete two-year degree program. However, graduates who later seek admission to baccalaureate programs may apply baccalaureate credits toward the new degree. Any 800-level credits taken in the Letters, Arts, and Sciences program are not applicable toward most baccalaureate degrees.

This major leads to the degree of Associate in Arts. To graduate, 60 credits are required.

	<i>Scheduling Recommendation by Term Standing</i>	
	1-3	4-6
I. Required Courses (36 credits)		
Communication skills (9 credits)		
+ Engl. 10 (3), 20 (3)	x	—
Sp.Com. 200 (3)	x	—
Arts (6 credits)		
**Select 6 credits in any courses designated as arts	x	x
Humanities (6 credits)		
**Select 6 credits in any courses designated as humanities	x	x
Social and behavioral sciences (6 credits)		
**Select 6 credits in any courses designated as social and behavioral sciences	x	x
Science (6 credits)		
**Select 6 credits in any courses designated physical, biological, or earth sciences	x	x
Mathematics (3 credits)		
**Select 3 credits in mathematics (Math. 0 and 4 <i>not</i> acceptable), statistics, computer science, or philosophy (Phil. 12, 212 <i>only</i> )	x	x
II. Related Courses (9 credits)		
**Select 9 credits in any one of the following areas: arts, humanities, social and behavioral sciences, science and mathe- matics, and foreign language skills	x	x
III. Electives (15 credits)	x	x

\*The 45 required and related credits must be baccalaureate-level courses. For those intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a Bachelor of Arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken since admission to a Bachelor of Arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

+ Students will be placed in Engl. 4, 10, or 30 on the basis of English Placement Test scores. If a student is placed in Engl. 30, successful completion of that course will satisfy the English requirement; in addition, 3 credits will be given for Engl. 10.

\*\*Courses which will satisfy the arts, humanities, social and behavioral sciences, and science and mathematics requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the associate dean for undergraduate studies or from any Letters, Arts, and Sciences representative.

## MASS COMMUNICATIONS—BROADCASTING

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to broadcasting.

To graduate, 61-63 credits are required.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3
Journ. 200, Mass Media and Society	3	Math. 800, Business Mathematics	3
Sp.Com. 245, Radio and Television Studio Operations	3	Sp.Com. 240, Broadcast Announcing	3
	—		—
	9		9
THIRD TERM		FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
Sp.Com. 335, Television and Radio Writing	3	Human. 101, Modern Science and Human Values	3
*Humanities selection	3	Sp.Com. 340, Radio Broadcasting	3
*Physical or biological science selection	3	Sp.Com. 200, Effective Speech	3
	—	*Arts selection	3
	9		—
			12
FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
Sp.Com. 280, Oral Interpretation	3	Music 5, Fundamentals of Music Appreciation	3
Sp.Com. 345, Television Broadcasting	3	Sp.Com. 296, Independent Studies	1-3
*Social science selection	3	Thea. 109, The Dramatic Arts in the Mass Media	3
Elective	3	Elective	3
	—		—
	12		10-12

\*To be selected in consultation with the program coordinator or adviser.



MASS COMMUNICATIONS—JOURNALISM

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to journalism.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
Engl. 4, Basic Writing Skills	3	Engl. 10, Composition and Rhetoric I	3
Journ. 800, History and Survey of Mass Communications	3	Journ. 801, Beginning News Writing	3
So.Sc. 1, The Urbanization of Man: A Social Science Perspective	3	Math. 800, Business Mathematics	3
Ph.Ed. 5	1	Elective	3
	—		—
	10		12
THIRD TERM		FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
Humanities selection	3	Arts 1, The Arts	3
Journ. 802, Beginning Reporting	3	Journ. 803, Fundamentals of Editing	3
Ph.Sc. 7, Physical Science	3	Ph.Sc. 8, Physical Science	3
Ph.Ed. 5	1	Ph.Ed. 5	1
	—		—
	10		10
FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
Human. 1, Values of the Western Cultural Heritage	3	Music 5, The Fundamentals of Music Appreciation	3
Journ. 804, Reporting the Community	3	Journ. 820, Newspaper Management	3
So.Sc. 2, Contemporary Man and Society	3	Sp.Com. 200, Effective Speech	3
Ph.Ed. 5	1	Elective	3
	—		—
	10		12

## MECHANICAL ENGINEERING TECHNOLOGY (Drafting and Design Technology)

This major is intended to prepare detail or layout draftsmen and junior designers for manufacturing industries as well as for the many concerns engaged in installation or erection work. The principal objective is to prepare young men and women for employment in machine design, tool and die design, or structural layout.

To graduate, 73-74 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.G. 12, Spatial Analysis	2
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3		
	<hr/> 12		<hr/> 11
THIRD TERM	<i>Credits</i>	+ SUMMER TERM	<i>Credits</i>
Cmp.Sc. 101, Introduction to Algorithmic Processes	3	I.E. 812, Manufacturing Processes	3
E.Mch. 811, Elementary Mechanics	3		
I.E. 811, Manufacturing Materials and Processes	3		
Math. 803, Technical Calculus	3		
	<hr/> 12		
FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
E.G. 803, Advanced Engineering Drawing	3	I.E. 815, Production Design	3
E.Mch. 813, Strength and Properties of Materials	3	M.E. 805, Kinematics	3
I.E. 315, Industrial Organization and Administration	3	Social science selection	3
Sp.Com. 200, Effective Speech	3	Technical selection	2-3
	<hr/> 12		<hr/> 11-12
SIXTH TERM	<i>Credits</i>		
A.E. 809, Structure Design	3		
M.E. 810, Product Design	3		
Humanities selection	3		
Technical selection	3		
	<hr/> 12		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.

+ Summer term to be taken at the University Park Campus.

## MEDICAL LABORATORY TECHNOLOGY

This two-year program (eight terms) is designed to provide the necessary general and technical training for hospital personnel between the level of the medical laboratory technician (certificate program) and the medical technologist. The program includes one full year of intensive clinical experience at an affiliated hospital and the theoretical background necessary for the clinical procedures performed by the registered medical laboratory technician (associate degree program).

This two-year program starts in the summer term. To graduate, 71-72 credits are required.

### I. General Education Requirements (39-40 credits)

Communications (6 credits)

Engl. 10 (3)

Sp.Com. 200 (3)

Quantification (4 credits)

Math. 4, 5, or 10 (3)

Cmp.Sc. 1 (1)

Natural Sciences (20-21 credits)

Biol. 29 (4)

Biol. 41 (3)

Biol. 42 (1)

Chem. 12 (3-4)

Chem. 14 (1)

Chem. 34 (3)

Micrb. 1 (3)

Micrb. 2 (2)

Arts and Humanities (3 credits)

Selection (3)

Social and Behavioral Sciences (6 credits)

Selection (6)

### II. \*Requirements for the Major (32 credits)

Bioch. 100 (8)

Micrb. 101 (8)

Micrb. 102 (8)

Micrb. 801 (8)

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\*Medical Laboratory Technician clinical experience (32 credits).

**METALLURGICAL ENGINEERING TECHNOLOGY (MET E)**

This program prepares students for positions in the metallurgical and metals-oriented industries as technical personnel in research laboratories and in quality control, and as supervisors of service groups and of production operations.

To graduate, 72 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Chem. 12, Chemical Principles	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Phys. 150, Technical Physics	3
E.G. 1, Engineering Drawing	2	Met.E. 800, Metallurgical Laboratory Practice	4
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	—		—
	11		13

THIRD TERM	<i>Credits</i>	SUMMER TERM	<i>Credits</i>
Chem. 14, Experimental Chemistry	1	I.E. 812, Manufacturing Processes; or Met.E. 806, Summer Field Practice	3
Met.E. 801, Principles of Extractive Metallurgy	2		
Phys. 151, Technical Physics	3		
Math. 803, Technical Calculus	3		
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3		
	—		
	12		

FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
E.E. 800, Applied Electricity	2	Econ. 2, Introductory Microeconomic Analysis and Policy; or Econ. 4, Introductory Macroeconomic Analysis and Policy; or Econ. 14, Principles of Economics	3
Met.E. 802, Physical Metallurgy	3	Met.E. 804, Ferrous Metallurgy	3
Met.E. 803, Materials Testing	3	Sp.Com. 200, Effective Speech	3
Cmp.Sc. 101, Introduction to Algorithmic Processes	3	Humanities selection	3
	—		—
	11		12

SIXTH TERM	<i>Credits</i>
I.E. 809, Inspection and Quality Control	3
Met.E. 805, Non-Ferrous Metallurgy	3
Met.E. 807, Metallurgical Operations	1
Social science selection	3
	—
	10

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.



MINING TECHNOLOGY

A student in mining technology receives a blend of basic sciences, mathematics, communications, humanities and social sciences, and applied courses during the period of study. These courses are sequenced so that basic principles of physical processes are used to understand the specific procedures involved in mining. The curriculum covers a complete spread of material at a level consistent with potential careers of mining technology graduates.

This major prepares students for career positions of a management-oriented or an engineering-oriented nature in the mining industry. Many of the graduates of this program, after serving the necessary apprenticeship, become certified managers in their fields.

The Maintenance option prepares a student to become a maintenance supervisor. Initially, the graduate would work as an apprentice electrician or mechanic and would gain experience in repairs and in planned maintenance. Once certification is obtained, it is expected that the graduate would become involved with maintenance planning, working as or with the chief mine mechanic or chief mine electrician.

The Production option prepares a student to become a mine foreman or an engineering aide. Initially, some of the assigned duties are to run transit and act as survey party chief, keep mine maps up-to-date and make projections, take samples and run analyses, make time studies, and assist with materials handling layouts.

The Surface Mining option prepares a student for work as an engineering aide or as a supervisor in surface mining. Initially, the graduate works as an assistant to engineers or to other supervisors. After a period of training, it is expected that the graduate may become involved in such areas of mining as pit design, equipment utilization, environmental control, reclamation, and mine laws and regulations.

To graduate in Mining Technology, 70 credits are required.

Maintenance Option

FIRST TERM	Credits	SECOND TERM	Credits
Econ. 14, Principles of Economics	3	Cmp.Sc. 1, Basic Computer Programming	1
Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
*Math. 801, Technical Mathematics	3	Sp.Com. 200	3
Mng.T. 800, Mining Technology Orientation	1	*Math. 802, Technical Mathematics	3
		Phys. 150, Technical Physics	3
	10		12
THIRD TERM	Credits	FOURTH TERM	Credits
Chem. 11, Introductory Chemistry	3	Mng.T. 807, Electrical Mine Machine Circuits	3
E.Mch. 811, Elementary Mechanics	3	Mng.T. 810, Mine Machine Dynamics	3
Mng.T. 804, Mine Plant Technology	3	Geosc. 1, Physical Geology; or	
**Math. 803, Technical Calculus	3	Geosc. 20, Our Earth	3
	12	Humanities selection	3
			12

\*The series of Math. 5 and 6 may substitute for the series of Math. 801 and 802.  
\*\*Math. 161 may substitute for Math. 803.

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Mng.T. 801, Coal Mining Technology	3	Engl. 826, Report Writing	3
Mng.T. 802, Mine Ventilation	3	Mng.T. 809, Mine Machinery Hydraulics	3
Mng.T. 808, Mine Power Distribution	3	Mgmt. 100, Survey of Management	3
Mng.T. 806, Mine Management and Law	3	Mng.T. 811, Practicum in Mine Maintenance	3
	<hr/>		<hr/>
	12		12

## Production Option

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
Econ. 14, Principles of Economics	3	Cmp.Sc. 1, Basic Computer Programming	1
Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
*Math. 801, Technical Mathematics	3	Sp.Com. 200	3
Mng.T. 800, Mining Technology Orientation	1	*Math. 802, Technical Mathematics	3
	<hr/>	Phys. 150, Technical Physics	3
	10		<hr/>
			12

THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Chem. 11, Introductory Chemistry	3	Geosc. 1, Physical Geology; or Geosc. 20, Our Earth	3
E.Mch. 811, Elementary Mechanics	3	Mn.Pr. 61, Introduction to Coal Preparation	3
Mng.T. 804, Mine Plant Technology	3	Humanities selection	3
**Math. 803, Technical Calculus	3	Mining technology selection	3
	<hr/>		<hr/>
	12		12

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
Mng.T. 801, Coal Mining Technology	3	Engl. 826, Report Writing	3
Mng.T. 802, Mine Ventilation	3	Mng.T. 803, Strata Control	3
Mng. 30, Introduction to Mining Engineering	3	Mng.T. 805, Mine Systems Technology	3
Mng. 806, Mine Management and Law	3	Mng. 23, Mineral Land and Mine Surveying	3
	<hr/>		<hr/>
	12		12

\*The series of Math. 5 and 6 may substitute for the series of Math. 801 and 802.

\*\*Math. 161 may substitute for Math. 803.

MINING TECHNOLOGY

Surface Mining Option

FIRST TERM		SECOND TERM	
Chem. 11, Introductory Chemistry	Credits 3	Cmp.Sc. 1, Basic Computer Programming	Credits 1
Engl. 10, Composition and Rhetoric I	3	E.G. 1, Engineering Drawing	2
*Math. 801, Technical Mathematics	3	Econ. 14, Principles of Economics	3
Mng.T. 800, Mining Technology Orientation	1	*Math. 802, Technical Mathematics	3
	—	Phys. 150, Technical Physics	3
	10		—
			12
THIRD TERM		FOURTH TERM	
**Math. 803, Technical Calculus	Credits 3	Engl. 826, Report Writing; or Mng. 23, Mineral Land and Mine Surveying	Credits 3
E.Mch. 811, Elementary Mechanics	3	Mng.T. 815, Surface Mining Technology	3
Geosc. 20, Our Earth	3	Mn.Pr. 61, Introduction to Coal Preparation	3
Mng.T. 804, Mine Plant Technology	3	Technical selection	3
	—		—
	12		12
FIFTH TERM		SIXTH TERM	
Mng.T. 816, Elements of Surface Mine Design	Credits 3	Engl. 826, Report Writing; or Mng. 23, Mineral Land and Mine Surveying	Credits 3
Mng.T. 817, Surface Mining Production Technology	3	Mng.T. 806, Mine Management and Law	3
Sp.Com. 200, Effective Speech	3	Mng.T. 818, Surface Mining Hydrology	3
Humanities selection	3	Mng.T. 819, Reclamation Technology	3
	—		—
	12		12

\*The series of Math. 5 and 6 may substitute for the series of Math. 801 and 802.

\*\*Math. 161 may substitute for Math. 803.

## NUCLEAR ENGINEERING TECHNOLOGY

This major is designed to provide technically trained personnel to support the rapidly developing nuclear industry between the levels of high school graduate and professional engineer. The wide scope of training prepares the nuclear technologist for careers in radiation safety, reactor operations, radioisotope handling, nuclear and control instrumentation, fuel fabrication, and health physics. A nuclear technologist may work as a radiological safety technician, engineering aide, or as a reactor operator at a nuclear facility.

To graduate, 73 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 801, Fundamentals of D.C. Circuits	3
Engr. 2, Engineering Orientation	1	E.E. 809, D.C. Circuits Laboratory	2
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
	<hr/> 12		<hr/> 12
THIRD TERM	Credits	FOURTH TERM	Credits
Chem. 11, Introductory Chemistry	3	Nuc.E. 800, Nuclear and Atomic Science	2
E.E. 814, Electrical Circuits	4	Nuc.E. 805, Principles of Measurement	3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3	Social science selection	3
Math. 803, Technical Calculus	3	Sp.Com. 200, Effective Speech	3
	<hr/> 13		<hr/> 11
FIFTH TERM	Credits	+ SIXTH TERM	Credits
*Engl. 826, Report Writing	3	Nuc.E. 803, Elements of Nuclear Power Generation	3
M.E. 807, Heat Transfer	3	Nuc.E. 804, Introduction to Reactor Technology	3
Nuc.E. 801, Radiological Safety	2	Nuc.E. 812, Nuclear Technology Laboratory	3
Nuc.E. 802, Elements of Nuclear Technology	2	Nuc.E. 814, Reactor Technology Laboratory	3
Humanities selection	3		
	<hr/> 13		<hr/> 12

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

+ Sixth term is to be taken at the University Park Campus.



PHYSICAL THERAPIST ASSISTANCE PROGRAM

The Physical Therapist Assistance program is designed to provide an opportunity for interested students to develop knowledge and skills in the principles of physical therapy techniques, appropriate use of equipment associated with various physical therapy treatment modalities, and the basic diagnostic approaches necessary for adequate rehabilitation programming efforts. In order to accomplish these tasks, the program utilizes a combination of basic science and nonscience course work coupled with appropriate clinical experiences.

To enter the program, students must have a high school diploma and satisfactory Scholastic Aptitude Test scores. The general requirements are listed below. Also, the size of each entering class must be limited to ten students so that optimal clinical experiences and practical application situations can be maintained. Close, personal supervision is essential for total program integrity.

A total of 67 credits are required for graduation.

	<i>Scheduling Recommendation by Term Standing</i>		
	1-3	4-6	7
General Education Requirements: 33 credits			
Communications (9 credits)			
Engl. 4, 10; or Engl. 10, 20 (6)	x	—	—
Sp.Com. 200 (3)	x	—	—
Quantification (3 credits)			
Math. 5, 10, or 17 (3)	—	x	—
Natural Sciences (11 credits)			
Biol. 29 (4), Ph.Sc. 7 (3)	x	—	—
Biol. 41 (3), 42 (1)	—	x	—
Social and Behavioral Sciences (6 credits)			
Psy. 2 (3), Soc. 1 (3)	x	—	—
Arts and Humanities (3 credits)			
Selection (3)	x	—	—
Health and Physical Education (1 credit)			
Hl.Ed. 19 (1)	—	x	—
Requirements for the Major: 34 credits			
Prescribed Courses (34 credits)			
Hl.Ed. 800 (3)	x	—	—
Hl.Ed. 384 (3), 801 (3), 802 (3), 803 (3), 804 (3), 805 (3)	—	x	—
Hl.Ed. 806 (10)	—	—	x
Psy. 37 (3)	—	x	—

## RAILWAY ENGINEERING TECHNOLOGY

The objective of this program is to prepare railway technicians for the revitalized railway industry. Such individuals will be able to run surveys, solve right-of-way and drainage problems, deal with track layout and maintenance problems, and work with basic railway structures. Graduates of the Railway Engineering Technology program may find employment as track foremen, track supervisors, track inspectors, and management trainees with the American railroads; as track inspectors with the Federal Railroad Administration; and as designers and estimators with consulting engineers.

To graduate, 72-73 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	Cmp.Sc. 1, Basic Computer Programming	1
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.G. 12, Spatial Analysis	2
Engr. 2, Engineering Orientation	1	*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3
Math. 801, Technical Mathematics	3	Math. 802, Technical Mathematics	3
	—		—
	12		11
THIRD TERM	<i>Credits</i>	SUMMER TERM	<i>Credits</i>
C.E. 812, Curves and Earthwork	3	C.E. 813, Practical Field Problems	4
C.E. 818, Route Surveying	2		
E.Mch. 811, Elementary Mechanics	3		
Math. 803, Technical Calculus	3		
	—		
	11		
FOURTH TERM	<i>Credits</i>	FIFTH TERM	<i>Credits</i>
C.E. 840, Hydrology and Drainage	3	C.E. 841, Economic Railway Location and Geometric Design	3
E.Mch. 813, Strength and Properties of Materials	3	E.E. 800, Applied Electricity	2
Phys. 150, Technical Physics	3	Phys. 151, Technical Physics	3
Sp.Com. 200, Effective Speech	3	Social science selection	3
	—		—
	12		11
SIXTH TERM	<i>Credits</i>		
C.E. 842, Railway Track Maintenance and Operation	3		
C.E. 843, Railway Track Structure Design and Construction	3		
Technical selection	2-3		
Humanities selection	3		
	—		
	11-12		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20.

RECREATION AND PARKS

Graduates of this major, which prepares students to assume leadership roles with recreation program participants, may organize and lead recreation activities in program areas such as sports, performing arts, or nature and camping. The graduate may supervise such facilities as community centers, parks, special sports centers, and nature centers in a variety of settings, e.g., municipal recreation and park departments, youth-serving agencies, hospitals, schools, nursing homes, and private or commercial agencies. To graduate, 66 credits are required for the associate degree.

RECREATION LEADERSHIP OPTION

I. General Education (38 credits)	Credits
A. Communication skills	9
Engl. 4 or 10 (3)	
Engl. 10 or 20 (3)	
Sp.Com. 200 (3)	
B. Science	6
6 credits selected from Biol. 111; Bi.Sc. 1, 3, 4; Chem. 11;	
Geosc. 20; Math. 800; Ph.Sc. 7	
C. Arts and humanities	9
A.Ed. 14 (3)	
Thea. 104 (3)	
Thea. 210 (3)	
D. Social and behavioral sciences	6
Psy. 2 or 37 (3)	
Soc. 1 or 5 (3)	
E. Health and physical education	8
Hl.Ed. 303 (2)	
Ph.Ed. 5 (3)	
Team sports	
Lifetime sports	
Swimming	
Ph.Ed. 270, Folk, Square, Social Dance (1)	
Ph.Ed. 380, Elementary School Activities (1)	
Ph.Ed. 807, Adapted Activities (1)	
II. Requirements for the Major (20-21 credits)	20-21
Rc.Pk. 120, Man and Leisure (3)	
Rc.Pk. 130, Outdoor Living Skills (1)	
Rc.Pk. 190, Perspectives for the Recreation and Parks Professional (3)	
Rc.Pk. 230, Camp Counseling (2); or Rc.Pk. 877, Therapeutic Recreation Program (3)	
Rc.Pk. 236, Theory and Practice of Recreation Leadership (3)	
Rc.Pk. 256, Recreation Program Organization (3)	
Rc.Pk. 275, Introduction to Therapeutic Recreation (3)	
Rc.Pk. 295, The Scope of Recreation and Parks Services (1)	
Rc.Pk. 850, Field Practicum (3)	
III. Electives (5-6 credits)	5-6

## RETAILING

This major, which trains for positions in retail stores, provides a minimum foundation of a general education, a basis for understanding customer wants and needs, and a technical knowledge of retail procedures. It includes one term of supervised store experience. The major constitutes a well-balanced program for individual growth and development as well as for specialized employment training. To graduate, 66 credits are required.

		<i>Credits</i>
I. General Education Requirements (21 credits)		
A.	Communication skills	
	6 credits in English, Sp.Com. 200	9
B.	Biological and physical sciences	
	A minimum of 3 credits in each area	6
C.	Arts and humanities	
	3 credits from either area	3
D.	Social and behavioral sciences	
	Selected in consultation with adviser	3
II. Requirements for the Major (45 credits)		
A.	Courses in retailing	
	Mktg. 804, 805, 806; H.Dev. 395; M.E.R. 213, 214, 301; Rtl. 840, 850	29
B.	Courses in individual development	
	I.F.S. 16 (1) plus adviser's recommendations for other college courses	7
C.	Professional selections	
	Selected in consultation with adviser	9



SCIENCE

This major is primarily designed to provide for the basic educational needs of students who desire to pursue professional programs as outlined by medical accrediting societies. The program provides a fundamental group of science courses of value to those who seek positions in government or industry where such knowledge is necessary or desirable. To graduate, 64 credits are required.

		<i>Scheduling Recommendation by Term Standing</i>	
		1-3	4-6
I. Required Courses: 52 credits			
A. Communication skills (6 credits)			
Engl. 10 (3)	x	—	
Sp.Com. 200 (3)	—	x	
B. Social and behavioral sciences (6 credits)	x	x	
C. Arts and humanities (6 credits)			
Human. 101 (3)	—	x	
Selection (3)	—	x	
D. Quantification (9 credits)			
Math. 10 (3), 20 (3)	x	—	
Cmp.Sc. 101 (3)	—	x	
E. Natural sciences (25 credits)			
Biol. 29 (4), 111 (3), Chem. 11 (3), Phys. 150 (3)	x	—	
Biol. 41 (3), Micrb. 6 (2), 7 (1), Phys. 151 (3)	—	x	
Chem. 34 (3) or Bioch. 1 (3)	—	x	
II. Related Courses: 12 credits			
Select 12 credits from the following biological, mathematical, and physical science courses:	x	x	
Biol. 33 (3), 42 (1), 112 (3), 113 (3), Bi.Sc. 3 (3), Chem. 12 (3), 13 (3), 14 (1), 15 (1), 35 (3), 102 (3), Astro. 1 (3), Stat. 200 (4), Math. 121 (3), Phil. 212 (3), Phys. 297 (3)			

## SCIENCE

## Radiologic Technologist Radiographer Option

This option is a twenty-seven-month program and requires nine terms to complete. For graduation, 65-66 credits are required.

	<i>Scheduling Recommendation by Term Standing</i>		
	1-3	4-6	7-9
I. Required Courses: 50-53 credits			
A. Communication skills (6 credits)			
Engl. 10 (3)	x	—	—
Sp.Com. 200 (3)	—	x	—
B. Social and behavioral sciences (6 credits)	x	x	—
C. Arts and humanities (6 credits)			
Human. 101 (3)	—	x	—
Selection (3)	—	x	—
D. Quantification (7-10 credits)			
Math. 10 (3); Math. 120 or 161 (3) or Stat. 200 (4)	x	—	—
Cmp.Sc. 1 (1) or 101 (3)	—	x	—
E. Natural sciences (25 credits)			
Biol. 29 (4), 111 (3), Chem. 11 (3), Phys. 150 (3)	x	—	—
Biol. 33 (3), 41 (3), Phys. 151 (3), 297 (3)	—	x	—
II. Related Courses (13 credits)			
R.T.R. 1 (1), 20 (1), 30 (1)	x	—	—
R.T.R. 40 (5), 50 (1), 60 (1)	—	x	—
R.T.R. 70 (1), 80 (1), 90 (1)	—	—	x

SOCIOLOGY

This major introduces students to the study of human groups and their relationships to each other and to the environment; it enables students to gain some proficiency in the scientific study of group structures and processes. A further objective is to help students become more skillful in working with community institutions, agencies, and organizations either through gainful employment or as a volunteer.

To graduate, 60 credits are required.

I. General Education (33 credits)	<i>Credits</i>
A. Speaking and writing skills	9
Engl. 10 (3), 20 (3)	
Sp.Com. 200 (3)	
B. Mathematics	3
Math. 4, 6, and 10 are not acceptable	
C. Science	6
Three credits in each of two groups listed below:	
a. Chemistry, physical science, physics	
b. Biological science, biology, biochemistry, microbiology	
c. Astronomy, geological science, meteorology, physical geography	
d. Computer science, statistics, symbolic logic (Phil. 12 or 212 only)	
D. Arts	3
E. Humanities	6
F. Social and behavioral sciences	6
(Not to include sociology)	
II. Requirements for the Major (18 credits)	18
Soc. 1 (3)	
Soc. 3 or 5 (3)	
Soc. 7 (3)	
*Additional credits in sociology (9)	
III. + Electives (9 credits)	9

\*Selected in consultation with the student's adviser to reflect the student's career and/or basic interests.  
+ For students planning to transfer to the B.A. program in either sociology or social welfare, one college-level course in a foreign language must be passed with at least a grade of C. It is also recommended that University Baccalaureate Degree Requirements be considered in so far as practical.

## SOLAR HEATING AND COOLING TECHNOLOGY

This major is designed to prepare solar technicians for the expanding solar and related industries. They will be prepared to help design, specify, test, supervise installation, and make cost estimates for residential and commercial solar energy-assisted heating and cooling systems involving the use of recognized standard components.

To graduate, 71 credits are required.

FIRST TERM		SECOND TERM	
	<i>Credits</i>		<i>Credits</i>
A.E. 801, Building Materials	3	A.E. 802, Methods of Construction	3
E.G. 3, Architectural Graphics	2	E.E. 800, Applied Electricity	2
*Engl. 4, Basic Writing Skills; or		Math. 802, Technical Mathematics	3
Engl. 10, Composition and		Phys. 150, Technical Physics	3
Rhetoric I	3		—
Math. 801, Technical Mathematics	3		11
S.T. 801, Introduction to Solar			
Technology	2		
	—		
	13		
THIRD TERM		FOURTH TERM	
	<i>Credits</i>		<i>Credits</i>
A.E. 803, Plumbing and Fire		A.E. 804, Heating, Ventilating, and	
Protection	3	Air Conditioning Layout	3
*Engl. 10, Composition and Rhetoric		Cmp.Sc. 101, Introduction to	
I; or Engl. 20, Composition and		Algorithmic Processes	3
Rhetoric II; or Engl. 826, Report		M.E. 881, Elementary Thermo and	
Writing	3	Fluid Dynamics	2
Math. 803, Technical Calculus	3	Sp.Com. 200, Effective Speech	3
Phys. 151, Technical Physics	3		—
	—		11
	12		
FIFTH TERM		SIXTH TERM	
	<i>Credits</i>		<i>Credits</i>
S.T. 806, Passive Systems and		S.T. 804, Analysis of Solar Heating	
Conservation Methods	3	and Cooling Systems	3
S.T. 807, Liquid Space Heating and		S.T. 809, Nontechnical Aspects of	
Domestic Hot Water Systems	3	Solar Technology	3
S.T. 808, Air Systems and		Humanities selection	3
Conventional Heating Equipment	3	Technical selection	3
Social science selection	3		—
	—		12
	12		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10 or 826. Students who begin with Engl. 10 are encouraged to take Engl. 20 or 826.



SURVEYING TECHNOLOGY

The objectives of the major are to provide a knowledge of the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys, and to develop trained personnel who understand the relation between the precision of measurements and the interpretation of data in addition to having an appreciation of the skills and equipment needed to make precise measurements in the field of surveying.

To graduate, 73-74 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
C.E. 811, Plane Surveying	3	C.E. 809, Topographic Drawing	2
E.G. 1, Engineering Drawing	2	*Engl. 4, Basic Writing Skills; or	
Engr. 2, Engineering Orientation	1	Engl. 10, Composition and	
Math. 801, Technical Mathematics	3	Rhetoric I	3
Phys. 150, Technical Physics	3	Math. 802, Technical Mathematics	3
	—	Phys. 151, Technical Physics	3
	12		—
			11

THIRD TERM	Credits	SUMMER TERM	Credits
C.E. 812, Curves and Earthwork	3	C.E. 813, Practical Field Problems	4
C.E. 818, Route Surveying	2		
Cmp.Sc. 1, Basic Computer Programming	1		
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II	3		
Math. 803, Technical Calculus	3		
	—		
	12		

FOURTH TERM	Credits	FIFTH TERM	Credits
C.E. 816, Special Surveys	3	C.E. 810, Statistics and Least Squares	3
C.E. 817, Cartographic Techniques	2	C.E. 814, Photogrammetry	3
E.G. 12, Spatial Analysis	2	*Engl. 826, Report Writing	3
E.Mch. 810, Basic Mechanics	2	Pl.Sc. 1, American National Government	3
Sp.Com. 200, Effective Speech	3		—
	—		12
	12		

SIXTH TERM	Credits
C.E. 815, Geodetic Surveying	3
C.E. 890, Legal Aspects of Surveying	2
Humanities selection	3
Technical selection	2-3
	—
	10-11

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20. Engl. 826 is required for all students in the program.

## TELECOMMUNICATIONS TECHNOLOGY

The field of telecommunications includes the transmission of voice and digital signals by telephone, telegraph, radio, television, and satellite. Graduates of this major will be engineering technicians who help select, design, install, operate, maintain, troubleshoot, and repair modern telecommunications systems.

Future uses for telecommunications systems include electronic mail, electronic shopping, home computer terminal tie-ins, remote utility meter reading, and the transmission of biomedical data between hospitals, libraries, and doctors' offices.

To graduate, 74 credits are required.

FIRST TERM	<i>Credits</i>	SECOND TERM	<i>Credits</i>
E.G. 1, Engineering Drawing	2	E.E. 801, Fundamentals of D.C. Circuits	3
*Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	E.E. 809, D.C. Circuits Laboratory	2
Engr. 2, Engineering Orientation	1	Math. 802, Technical Mathematics	3
Math. 801, Technical Mathematics	3	Phys. 151, Technical Physics	3
Phys. 150, Technical Physics	3	I.E. 805, Economics of Industry	2
—	—	—	—
	12		13

THIRD TERM	<i>Credits</i>	FOURTH TERM	<i>Credits</i>
Cmp.Sc. 1, Basic Computer Programming	1	E.E. 804, A.C. Circuits	2
E.E. 814, Electrical Circuits	4	E.E. 807, A.C. and Electronics Laboratory	2
E.E. 818, Electrical Circuits Laboratory	1	E.E. 810, Fundamentals of Semiconductors	3
*Engl. 10, Composition and Rhetoric I; or Engl. 20, Composition and Rhetoric II; or Engl. 826, Report Writing	3	Social science selection	3
Math. 803, Technical Calculus	3	TelCm. 840, Introduction to Telecommunications Systems	2
—	—	—	—
	12		12

FIFTH TERM	<i>Credits</i>	SIXTH TERM	<i>Credits</i>
E.E. 816, Linear Electronic Circuits	3	E.E. 817, Advanced Electronics	4
E.E. 821, Linear Electronics Laboratory	1	E.E. 820, Advanced Electronics Laboratory	1
E.Mch. 810, Basic Mechanics	2	Sp.Com. 200, Effective Speech	3
Humanities selection	3	TelCm. 843, Transmission	3
TelCm. 841, Switching and Traffic	3	TelCm. 844, Advanced Telecommunications Laboratory	1
TelCm. 842, Elementary Telecommunications Laboratory	1	—	—
—	—		12
	13		

\*Students are placed in Engl. 4 or 10 on the basis of English Placement Test scores. Students who are placed in Engl. 4 also must take Engl. 10. Students who begin with Engl. 10 are encouraged to take Engl. 20 or Engl. 826.

WILDLIFE TECHNOLOGY

This program will prepare a student in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and care, maintenance, and propagation of animals. They will support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research.

To graduate, 65 credits are required.

FIRST TERM	Credits	SECOND TERM	Credits
E.G. 10, Introductory Engineering Graphics	1	C.E. 809, Topographic Drawing	2
Engl. 4, Basic Writing Skills; or Engl. 10, Composition and Rhetoric I	3	Engl. 10, Composition and Rhetoric I; or Engl. 826, Report Writing	3
For. 203, Field Dendrology	2	Math. 801, Technical Mathematics I	3
Wildl. 801, Introduction to Wildlife Management	3	Wildl. 804, Wildlife Mensuration	3
	—		—
	9		11

THIRD TERM	Credits	SUMMER TERM	Credits
Wildl. 803, Animal Identification	3	Wildl. 805, Field and Laboratory Techniques	3
Wildl. 812, Wildlife Field Surveys	3	Wildl. 806, Operational Procedures and Equipment	2
Wildl. 814, Habitat Management	3		—
	—		5
	9		

FOURTH TERM	Credits	FIFTH TERM	Credits
Sp.Com. 200, Effective Speech	3	For. 242, Elements of Project Supervision in Forestry	3
For. 808, Forest Protection	3	Wildl. 809, Animal Care	3
Wildl. 807, Outdoor Recreation	3	Wildl. 811, Aerial Photo Interpretation	4
Social science selection	3		—
	—		10
	12		

SIXTH TERM	Credits
Acctg. 816, Introductory Accounting Survey	3
Human. 101, Modern Science and Human Values	3
Wildl. 813, Fisheries Management for Technicians	3
	—
	9

# COURSE DESCRIPTIONS

## CREDITS AND HOURS

A credit requires three 75-minute periods per week of an average student's time. The distribution of that time between class activities (such as lecture, recitation, laboratory, field trips, etc.) and outside preparation varies from course to course.

Credits, classroom work, and laboratory work are indicated by three numbers in parentheses immediately following the course title.

1. The first number shows the maximum course credits and therefore the total time required by the course per week. For example, a 2-credit course normally requires 7½ hours per week for class activity and individual preparation.
2. The second number shows the periods of classroom work (a period is 75 minutes), including lecture, recitation, class discussion, demonstration, or various combinations of these.
3. The third number shows the periods of practicum room work (a period is 75 minutes), including laboratory, shop work, studio, drafting room, field trips, etc.

Courses numbered from 800 to 899 are reserved for the associate degree majors. Credit received for 800-series courses may be applicable to a particular baccalaureate degree program offered by the University at the discretion of the appropriate college and major department. Courses numbered from 1 to 399 carry baccalaureate credit and are required in most of the associate degree majors. Elective credit courses vary from campus to campus and term to term, and all of the courses listed below are not offered at each campus. Students may obtain information about the specific course offerings for a given campus from the appropriate *Schedule of Classes*.

## ACCOUNTING (ACCTG)

16. **INTRODUCTORY ACCOUNTING SURVEY (3:3:0)** Accounting for proprietorships, partnerships, and corporations for retailers and manufacturers; financial statement analysis. Students who have passed Acctg. 101 may not schedule this course.

101. **INTRODUCTORY FINANCIAL ACCOUNTING (3:2½:1)** Fundamentals of the collection, recording, summarization, and interpretation of accounting data.

102. **INTRODUCTORY MANAGERIAL ACCOUNTING (3:2½:1)** Actual and standard cost systems; managerial uses of cost data. Prerequisite: Acctg. 101.

801. **INTRODUCTORY ACCOUNTING (3:2:1)**

802. **INTRODUCTORY ACCOUNTING (3:2:1)** Prerequisite: Acctg. 801.

803. **INTERMEDIATE ACCOUNTING (3:3:0)** Financial accounting statements, concepts, and procedures; assets, liabilities, owners' equity, statement analysis. Prerequisite: Acctg. 802.

806. **FEDERAL TAX ACCOUNTING (3:3:0)** Federal tax revenue system as it affects the individual and business; tax planning, research, and preparation of returns. Prerequisite: Acctg. 802.

807. **MANAGERIAL ACCOUNTING (3:3:0)** Cost and budgetary control; preparation of information for decision making. Prerequisite: Acctg. 802.

816. **INTRODUCTORY ACCOUNTING SURVEY (3:3:0)** Fundamentals of accumulation and summarization of accounting data; emphasis on financial statement analysis and the uses of accounting in business.

## ADMINISTRATION OF JUSTICE (ADM J)

7. (Com.D. 7) **INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0)** An introduction to the study of community, community systems, and impact on the individual.

111. **INTRODUCTION TO THE AMERICAN CRIMINAL JUSTICE SYSTEM (3:3:0)** Criminal justice system including formulation of laws, extent of crime, processing and correction of offenders, victims.

221. **ISSUES IN THE AMERICAN CRIMINAL JUSTICE SYSTEM (3:3:0)** Examination of the models of the criminal process, functions of the justice system, and approaches to crime and punishment. Prerequisite: Adm.J. 111.



## **AGRICULTURAL ECONOMICS**

240. **RESEARCH STRATEGIES IN ADMINISTRATION OF JUSTICE (3:3:0)** A survey of the various research strategies relevant to the investigation of research questions in the administration of justice. Prerequisite: Stat. 200.

394. **INTRODUCTION TO FIELD WORK IN ADMINISTRATION OF JUSTICE (1:1:0)** Planning and preparation for field experience in an administration of justice agency setting. Prerequisites: Adm.J. 7, 221, 240.

395. **FIELD WORK IN ADMINISTRATION OF JUSTICE (8:0:16)** Field experience focusing on the student's major interest within the administration of justice. Prerequisite: Adm.J. 394.

396. **POST FIELD WORK SEMINAR IN ADMINISTRATION OF JUSTICE (1:1:0)** Examination of concepts, critical issues, processes, and procedures which are useful in explaining and understanding the field internship experience. Prerequisite: Adm.J. 395.

495. **FIELD PROJECT IN ADMINISTRATION OF JUSTICE (8:0:16)** Independent study and field research in an administration of justice setting different from required field project. Prerequisites: Adm.J. 394, 395, 396.

## **AGRICULTURAL ECONOMICS (AG EC)**

101. **INTRODUCTION TO AGRICULTURAL ECONOMICS (3:3:0)** Application of economic principles to resource allocation problems in the production, marketing, and consumption of food and agricultural products. Not open to students in Agricultural Economics and Rural Sociology or Agricultural Business.

102. **INTRODUCTION TO FOOD AND AGRICULTURAL MARKETING (3:3:0)** Comprehensive theoretical and descriptive survey of farm and food products marketing from the perspective of producers, marketing middlemen, and consumers.

106. **INTRODUCTION TO FARM MANAGEMENT (3:3:0)** Organizing and operating farm businesses for financial success; measuring profits; improving efficiency of labor, land, capital; getting started in farming.

## **AMERICAN STUDIES (AM ST)**

100. **INTRODUCTION TO AMERICAN STUDIES (3:3:0)** A study of selected attempts to identify and interpret movements and patterns in American culture. Prerequisite: fourth-term standing.

105. **AMERICAN POPULAR CULTURE AND FOLKLIFE (3:3:0)** Survey of popular culture, folklife, and ethnicity, synthesizing material from such areas as literature, media, entertainment, print, music, and film.

## **ANTHROPOLOGY (ANTHY)**

1. **INTRODUCTORY ANTHROPOLOGY (3:3:0)** Prehistoric and primitive people and cultures; primitive customs and institutions compared with those of modern man.

45. **CULTURAL ANTHROPOLOGY (3:3:0)** Beginnings of human culture; primitive economic life, society, government, religion, and art; cultural background of personality development.

148. **CULTURES OF THE MIDDLE EAST (3:3:0)** An introduction to the cultures of the Middle East.

## **ARCHITECTURAL ENGINEERING TECHNOLOGY (A E)**

801. **BUILDING MATERIALS (3:3:0)** Structural and architectural use of building materials and construction assemblies.

802. **METHODS OF CONSTRUCTION (3:1:5)** Materials and methods of construction used in buildings, as expressed in drawings. Prerequisites: A.E. 801, E.G. 3.

803. **PLUMBING AND FIRE PROTECTION (3:2:2)** Layout of plumbing and fire protection in buildings to meet code and usage requirements. Prerequisite or concurrent: A.E. 802.

804. **HEATING, VENTILATING, AND AIR CONDITIONING LAYOUT (3:2:2)** Fundamental calculations and layout of systems in buildings. Prerequisite: A.E. 803.

807. **ADVANCED CONSTRUCTION METHODS (3:1:5)** Integration of materials and systems in working drawings. Prerequisite: sixth-term standing.
808. **GRAPHIC ANALYSIS (2:0:6)** Graphical analysis of force systems, centers of gravity, stresses in framed structures, arches, walls, moments, and deflections of beams. Prerequisites: E.G. 12, E.Mch. 811.
809. **STRUCTURE DESIGN (3:1:5)** Elementary principles of structural design and detailing in timber, steel, and reinforced concrete; use of handbooks, fundamentals of structural and architectural drafting. Prerequisites: E.Mch. 813; A.E. 802 or E.G. 803.
810. **ARCHITECTURAL ENGINEERING OFFICE PRACTICE (3:3:0)** Procedures involved in production of contract documents, both drawings and specifications. Prerequisite: sixth-term standing.
812. **BUILDING LIGHTING AND ELECTRICAL LAYOUT (3:2:2)** Layout of lighting and electrical distribution in buildings.
814. **STEEL CONSTRUCTION (3:2:2)** Strength of materials as applied to the design of simple steel structures. Prerequisites: A.E. 802, E.Mch. 811.
815. **CONCRETE CONSTRUCTION (3:2:2)** Fundamentals of design and construction of reinforced concrete structures. Prerequisites: A.E. 802, E.Mch. 811.
830. **SELECTED TOPICS IN ARCHITECTURAL ENGINEERING TECHNOLOGY (3)** Individual or group work in architectural engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ART (ART)

110. **DESIGN: COLOR AND LIGHT (2:1:3)** The fundamentals of color. Investigation of color systems, color harmony, and the illusory nature of color on two-dimensional surfaces.
111. **DESIGN: THREE-DIMENSIONAL (2:1:3)** Introduction to design in three dimensions. Principles of visual organization in working with actual space and volume.
120. **INTRODUCTION TO DRAWING (2:1:3)** The study and practice of basic drawing as a way of understanding and communicating.
- 121A. **TECHNIQUES FOR DRAWING (2:1:3)** Drawing with emphasis upon observation, organization, and particular emphasis on the development of skills. Prerequisite: Art 120.
180. **CERAMIC ARTS (2:1:3)** Introduction to potter's wheel techniques; experiments with decorative application; includes the technical concerns for clay, glazes, and kilns. For non-art majors.
280. **INTRODUCTORY CERAMIC ARTS (2:1:3)** The fundamentals of ceramics, throwing, hand-building, and glazing; acquainting the student with ceramic materials, techniques, and philosophy. Prerequisite: 2 credits in studio art.
296. **INDEPENDENT STUDIES (1-12)**

## ART EDUCATION (A ED)

14. **INTRODUCTORY CRAFTS FOR TEACHERS (3:1:5)** Direct experience with materials such as wood, clay, metal, paper, textiles, and plastics in relationship to the creative needs of children.

## ART HISTORY (ART H)

100. **INTRODUCTION TO ART (3:3:0)** An approach to the understanding of art through a critical analysis of selected works of architecture, painting, and sculpture. Students who have passed Art H. 110 may not schedule this course.
110. **SURVEY OF WESTERN ART (3:3:0)** General survey of major developments in architecture, painting, and sculpture in the Western world. Students who have passed Art H. 100 may not schedule this course.
214. **MODERN ARCHITECTURE (3:3:0)** Architecture and related arts of sculpture and painting from the end of the eighteenth century to the present day. Nontechnical in nature.

## THE ARTS

305. MODERN PAINTING (3:3:0) The development of painting from the French Revolution to the present.
307. AMERICAN ART (3:3:0) History of art in the English colonies and the United States from the seventeenth century to the present.

## THE ARTS (ARTS)

1. THE ARTS (3:3:0) Developing perception in the arts through relating the visual, musical, performing, and environmental arts.

## ASTRONOMY (ASTRO)

1. ASTRONOMICAL UNIVERSE (3:3:0) Nonmathematical description of the astronomical universe and the development of scientific thought. For nonscience majors. Students who have passed Astro. 90 may not schedule this course.

## BIOCHEMISTRY (BIOCH)

100. CLINICAL CHEMISTRY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15) Theoretical and practical concepts associated with clinical chemistry testing procedures used in the diagnosis of human diseases. Prerequisite: Chem. 34.

## BIOLOGICAL SCIENCE (BI SC)

1. STRUCTURE AND FUNCTION OF ORGANISMS (3:3:0) Origin, development, and cellular basis of life; fundamental principles, processes and structures of organisms. Students who have passed Biol. 27, 41, 111, 112, or 113 may not schedule this course.
2. GENETICS, ECOLOGY, AND EVOLUTION (3:3:0) How living organisms pass on their inheritance, how plants and animals came to be what they are, and how they now react. Students who have passed Biol. 33, 111, 112, 113, or 222 may not schedule this course.
3. MAN AND HIS ENVIRONMENT (3:3:0) Kinds of environments; past and present uses and abuses of natural resources; disposal of man's wastes; prospects for the future. Students who have passed Biol. 210 or any other upper-level ecology course in biology may not schedule this course.
4. BIOLOGY OF MAN (3:3:0) A general survey of structure and function in man—from conception, through growth and reproduction, to death. Students who have passed Biol. 29 and 41 may not schedule this course.

## BIOLOGY (BIOL)

29. MAMMALIAN ANATOMY (4:2:4) Anatomy of a mammal, with special reference to that of man. Students who have passed Biol. 421 may not schedule this course.
33. HUMAN GENETICS (3:3:0) Human heredity and its individual and social implications. Students who have passed Biol. 222 may not schedule this course. Prerequisite: 3 credits in biological sciences.
41. PHYSIOLOGY (3:3:0) Normal functions of the animal body, with special reference to those of man. Students who have passed Biol. 472 may not schedule this course.
42. PHYSIOLOGY LABORATORY (1:0:2) Experiments demonstrating basic physiological principles with special reference to man. Prerequisite or concurrent: Biol. 41.
111. LIFE SCIENCE (3:2:2) Structure, metabolism, development, reproduction, and evolution of plants and animals.
112. BOTANY (3:2:2) Structure, metabolism, development, reproduction, and evolution of plants with an introduction to the fields of anatomy, morphology, and physiology. Prerequisite: Biol. 111.



113. ZOOLOGY (3:2:2) Morphology, physiology, development, life history, and evolution of animals with a consideration of their importance to human welfare. Prerequisite: Biol. 111.

## **BIOMEDICAL EQUIPMENT TECHNOLOGY (B E T)**

801. PHYSIOLOGICAL TRANSDUCERS (3:2:2) Study of the principles of operation and applications of devices used for the conversion of physiological events to electrical signals. Concurrent: E.E. 816.

802. BIOMEDICAL INSTRUMENTATION AND SYSTEMS (3:2:2) Introduction to the operating principles, calibration, and maintenance of biomedical instruments and systems with special emphasis given to patient safety. Prerequisite: B.E.T. 801.

803. BIOMEDICAL EQUIPMENT LABORATORY (INTERNSHIP) (4:1:6) Practical experience, within or related to the hospital environment, on a variety of biomedical instruments. Prerequisites: B.E.T. 804 and Biol. 41.

804. MEDICAL AND CLINICAL EQUIPMENT (3:2:2) Principles of operation of clinical, medical radiography, intensive care, anesthesia, respiratory, non-invasive imaging, and emergency equipment; hospital electrical safety. Prerequisite: B.E.T. 801.

830. SELECTED TOPICS IN BIOMEDICAL EQUIPMENT TECHNOLOGY (3) Individual or group work in biomedical equipment technology for students with specific occupational objectives. Prerequisite: fourth-term standing.

## **BUSINESS ADMINISTRATION (B A)**

803. COOPERATIVE PRACTICUM WITH BUSINESS OFFICES (6:0:12) Cooperative practical work with business offices under the supervision of the instructor.

## **BUSINESS LAW (B LAW)**

243. LEGAL ENVIRONMENT OF BUSINESS (3:3:0) Social control through law: courts, basic policies underlying individual and contractual rights in everyday society. Prerequisite: fourth-term standing.

850. REAL ESTATE LAW (3:3:0) Basic legal principles involved in the negotiation of real estate transactions. Prerequisite: B.Law 843.

## **BUSINESS LOGISTICS (B LOG)**

102. PHYSICAL DISTRIBUTION (3:3:0) Physical distribution function in business; role played by transportation, warehousing, location, inventory control; concept of a business logistics system. Prerequisite: fourth-term standing.

104. TRANSPORT SYSTEMS (3:3:0) Conceptual model of a transport system; environmental relationships; modal components and internal constraints, with special application to the United States. Prerequisite: fourth-term standing.

206. TRAFFIC MANAGEMENT (3:3:0) Analysis of the traffic function in the logistics system. Evaluation of routes, rates, and shipping document procedures. Prerequisite: B.Log. 102 or 104.

## **CHEMICAL ENGINEERING TECHNOLOGY (CH E)**

800. TECHNICAL CALCULATIONS (3:3:0) Engineering units and their conversion. Technique of solving elementary problems in industrial stoichiometry, material balances, and heats of reaction. Prerequisites or concurrent: Chem. 13 and 15.

802. CHEMICAL TECHNOLOGY (3:3:0) Introductory discussion and problems relating to flow of fluids and transfer of heat. Prerequisite: fourth-term standing.

803. CHEMICAL TECHNOLOGY (3:3:0) Elementary discussion and problems involving evaporation, distillation, and air-water interaction. Prerequisite: Ch.E. 800.



## CHEMISTRY

820. **CHEMICAL TECHNOLOGY LABORATORY (4:2:6)** Measurements in fluid flow, heat transfer, distillation, mass transfer; chemical analytical techniques; industrial laboratory report writing. Prerequisite or concurrent: Ch.E. 803.

830. **INDUSTRIAL CHEMISTRY (3:3:0)** The commercial preparation of important chemicals and derivatives with emphasis upon the chemistry involved and the flow of material. Prerequisites or concurrent: Chem. 13 and 15.

831. **SELECTED TOPICS IN CHEMICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in chemical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## CHEMISTRY (CHEM)

11. **INTRODUCTORY CHEMISTRY (3:2:2)** Selected principles and applications of chemistry. Prior study of chemistry not assumed.

12. **CHEMICAL PRINCIPLES (3-4)** Basic concepts and quantitative relations. Prerequisite: Satisfactory performance on placement examination—students take Chem. 12 for 3 credits. Unsatisfactory performance on placement examination—students take Chem. 12 for 4 credits.

13. **CHEMICAL PRINCIPLES (3:3:0)** Continuation of Chem. 12, including introduction to the chemistry of the elements. Prerequisite: Chem. 12. Prerequisite or concurrent: Chem. 14.

14. **EXPERIMENTAL CHEMISTRY (1:0:3)** Introduction to quantitative experimentation in chemistry. Prerequisite or concurrent: Chem. 12.

15. **EXPERIMENTAL CHEMISTRY (1:0:3)** Continuation of Chem. 14 with emphasis on analytical procedures. Prerequisite: Chem. 14. Prerequisite or concurrent: Chem. 13.

23. **INTRODUCTION TO MODERN ANALYTICAL CHEMISTRY (4:2:4)** Contemporary methods of chemical and instrumental analysis, including potentiometric titration, specific ion electrodes, spectrophotometry, and chromatography. Prerequisite: Chem. 15.

30. **ORGANIC CHEMISTRY (3:3:0)** Principles and theories; nomenclature; chemistry of the functional groups; applications of spectroscopy. Prerequisite: Chem. 13. Prerequisite or concurrent: Chem. 15.

31. **ORGANIC CHEMISTRY (2:2:0)** Continuation of Chem. 30. Prerequisite: Chem. 30.

33. **ORGANIC CHEMISTRY (2:2:0)** Continuation of Chem. 31, especially the chemistry of polyfunctional organic molecules. Prerequisite: Chem. 31.

34. **ORGANIC CHEMISTRY (3:3:0)** Introduction to organic chemistry with emphasis on the properties of organic compounds of biochemical importance. Prerequisite: Chem. 11 or 12.

35. **ORGANIC CHEMISTRY (3:2:4)** Introduction to organic chemistry with emphasis on the identification of organic compounds by characteristic chemical reactions and by spectroscopy. Prerequisite: Chem. 34.

36. **LABORATORY IN ORGANIC CHEMISTRY (2:0:6)** Basic laboratory operations; applications of theories and principles. Prerequisite or concurrent: Chem. 31.

102. **ENVIRONMENTAL CHEMISTRY (3:3:0)** Applications of chemistry to environmental problems, including air, water, thermal pollution; pesticides; drugs and birth control agents; food additives; etc. For nonchemistry majors; chemistry majors will not receive credit.

800. **GENERAL CHEMISTRY (3:2:3)** Basic principles of chemistry; properties and uses of some industrially important elements and compounds.

## CIVIL ENGINEERING TECHNOLOGY (C E)

809. **TOPOGRAPHIC DRAWING (2:0:4)** Conventional mapping symbols; constructing topographic maps from stadia notes; estimating quantities from topographic maps. Prerequisite: E.G. 1 or 10. Prerequisite or concurrent: C.E. 811 or Wildl. 812.

810. **STATISTICS AND LEAST SQUARES (3:2:2)** Frequency distribution; histograms; frequency polygons; measures of central tendency; dispersion; uses of normal curve; least squares applied to surveying problems. Prerequisite: Math. 803. Prerequisite or concurrent: C.E. 815.

811. PLANE SURVEYING (3:2:3) Theory of plane surveying; use, care, and adjustments of surveying equipment; traversing, areas, leveling, stadia, and plane table mapping. Prerequisite or concurrent: Math. 801.
812. CURVES AND EARTHWORK (3:2:3) Computation and laying out of horizontal and vertical curves; calculation of cut and fill; setting slope stakes for construction. Prerequisite or concurrent: C.E. 811, Math. 802.
813. PRACTICAL FIELD PROBLEMS (4:1:9) Geodetics, topography, field astronomy; route location; hydrographic surveys; land subdivision; use of electronic measuring devices. Prerequisites: C.E. 812, 818.
814. PHOTOGRAMMETRY (3:2:3) Interpretation and use of aerial photographs; mapping by photogrammetric methods; application of aerial and terrestrial photographic surveying to specific engineering problems. Prerequisite: C.E. 818.
815. GEODETIC SURVEYING (3:2:3) Precision vertical and horizontal control surveys; level nets; reciprocal leveling; triangulation; state plane coordinates; astronomic observations for azimuth and latitude. Prerequisites: C.E. 811, Math. 802.
816. SPECIAL SURVEYS (3:2:3) Applications of surveying in hydrography, mining, construction, and subdivision planning; surveying registration law and professional ethics. Prerequisites: C.E. 812, 813.
817. CARTOGRAPHIC TECHNIQUES (2:0:4) Use of tools and equipment; projections used in art, advertising, government maps; relief methods; scribing techniques; map reproduction methods. Prerequisite: C.E. 809.
818. ROUTE SURVEYING (2:1:3) Field and office operations connected with highway and railroad location; mass diagram as related to economical distribution of earthwork. Prerequisite: C.E. 811. Concurrent: C.E. 812.
821. CONCRETE TECHNOLOGY (3:2:3) Characteristics of Portland cement concrete, physical properties of constituent materials, testing procedures, basics of reinforced concrete. Prerequisite: E.Mch. 813.
822. SOIL MECHANICS (3:2:3) Identification, classification, sampling, testing, handling, and consolidation of soils for highway construction. Prerequisites: E.Mch. 810, Phys. 151.
823. HIGHWAY ORGANIZATION AND OPERATIONS (3:3:0) Fundamentals of technology; plans and specifications; drainage, cost, traffic studies, and highway safety. Prerequisite: second-year standing in Highway Engineering Technology.
824. ASPHALT TECHNOLOGY (3:2:3) The use and testing of asphaltic material as adapted to highways.
825. CONSTRUCTION ESTIMATING (3:3:0) Job organization, estimating, cost control, construction methods and equipment for highway construction projects.
830. SELECTED TOPICS IN CIVIL ENGINEERING TECHNOLOGY (3) Individual or group work in civil engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.
840. HYDROLOGY AND DRAINAGE (3:2:2) Introduction to railway hydrology and drainage, soil studies, erosion control, and hydraulic design of culverts. Prerequisites: C.E. 809, 811.
841. ECONOMIC RAILWAY LOCATION AND GEOMETRIC DESIGN (3:2:2) Railway economics, history, design, and maintenance of vertical and horizontal curves; speed and super-elevation. Prerequisites: C.E. 812, 818; C.E. 816 or 840.
842. RAILWAY TRACK MAINTENANCE AND OPERATION (3:1:5) Specifications for safety standards for track, programming maintenance operations, track inspection. Prerequisite: C.E. 841. Concurrent: C.E. 843.
843. RAILWAY TRACK STRUCTURE DESIGN AND CONSTRUCTION (3:1:5) Design, layout, and construction of yards, turnouts, interlocking plants, and structures. Prerequisites: E.Mch. 813, C.E. 841. Concurrent: C.E. 842.
861. FLUID FLOW (3:3:0) Elementary theory of fluid flow: hydrostatics; flow through orifices, Venturi meters, and pipes; flow in open channels; theory of the centrifugal pump. Prerequisites: E.Mch. 810 or 811, Math. 802.
890. LEGAL ASPECTS OF SURVEYING (2:2:0) Legal principles affecting the determination of property boundaries; responsibilities of surveyors, attorneys, title companies, and the court. Prerequisite: C.E. 811.



## COMMUNITY DEVELOPMENT

### COMMUNITY DEVELOPMENT (COM D)

7. (Adm.J. 7) **INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0)** An introduction to the study of community, community systems, and impact on the individual.

170. **COMMUNITY LEADERSHIP (2:2:1)** Principles and techniques of participation in voluntary community groups concerned with strengthening family and community life.

### COMPUTER SCIENCE (CMPSC)

1. **BASIC COMPUTER PROGRAMMING (1:0:2)** Fundamental characteristics of digital computers; organization and coding of problems for solution on digital computer. Prerequisite: 2 entrance units in mathematics.

101. **INTRODUCTION TO ALGORITHMIC PROCESSES (3:3:0)** Properties of algorithms, languages, and notations for describing algorithms; applications of a procedure-oriented language to problem solving. Students who have passed Cmp.Sc. 201, 203, 401, or 402 may not schedule this course. Prerequisite: 2 entrance units in mathematics.

102. **COMPUTER ORGANIZATION AND PROGRAMMING (3:3:0)** Computer components and organization, representation of numbers and characters, instruction codes, machine-language programming, assembly systems, input-output, subroutines, and macros. Prerequisite: Cmp.Sc. 101.

110. **STRUCTURED PROGRAMMING WITH NUMERICAL METHODS (3:3:0)** Introduction to the disciplined construction of algorithms; structured programming; examples from text processing and elementary numerical methods; error analysis; recursion. Prerequisite: Cmp.Sc. 101 or 201.

140. **INTRODUCTION TO DATA PROCESSING (3:3:0)** Applications of digital computers to problems in data processing with examples from accounting, record updating, inventory control, and report generation. Prerequisite: Cmp.Sc. 101.

144. **DATA ORGANIZATION AND ACCESSING TECHNIQUES (4:3:2)** Design characteristics of external storage devices; record organizations; accessing considerations for sequential, direct, relative, and indexed files; internal data structures. Prerequisites: Cmp.Sc. 102, 140.

154. **ADVANCED ASSEMBLER, I/O TECHNIQUES, AND JOB CONTROL LANGUAGES (3:3:1)** Macro-expansion; assembler-level I/O control; COBOL-assembler linkage conventions; advanced debugging techniques; assembler design; op-system features and JCL techniques. Students may not take both Cmp.Sc. 154 and 442 for credit. Prerequisite: Cmp.Sc. 144.

164. **CONTEMPORARY TRENDS IN COMPUTER PROGRAMMING (3:3:0)** State of the technology in design, code, test, and documentation techniques for information processing systems and large EDP production programs. Students may not take both Cmp.Sc. 164 and 444 for credit. Prerequisite: Cmp.Sc. 154.

803. **COMPUTER APPLICATIONS IN BUSINESS (3:3:0)** Characteristics of digital computers; the role of data processing in business; programming in a high-level language. Designed for two-year business administration students. Students who have passed Cmp.Sc. 101, 201, or 203 may not schedule this course.

804. **COMPUTER FUNDAMENTALS AND APPLICATIONS (2:2:0)** Types of computers and computer systems; storage and I/O devices; number systems and data representation; computer applications; typical EDP organization.

805. **COMPUTER APPLICATION PROBLEM (1-3)** The organization, flow charting, programming, debugging, and documentation of a major applied problem in a field of computer application. Prerequisite: fifth-term standing.

890. **SPECIAL TOPICS IN COMPUTER PROGRAMMING (1-3)** Application of any of several specific computer programming languages to problem solving. Prerequisite: Cmp.Sc. 101.

### CURRICULUM AND INSTRUCTION (C I)

211. **INTRODUCTORY FIELD EXPERIENCE FOR TEACHER PREPARATION (2-3 per term, maximum of 6)** Selected observation of schooling situations with small group and tutorial participation. Prerequisite: third-term standing. Concurrent: Ed.Th.P. 115 and/or Ed.Psy. 14.

## EARTH SCIENCE (EARTH)

1. EARTH SCIENCE (3:3:0) Integrated approach to fundamental problems in the earth sciences. Fields of study include geological sciences, physical geography, and meteorology. No credit will be given for this course if a student takes Geosc. 20, Geog. 19, or Meteo. 300.

## ECONOMICS (ECON)

2. INTRODUCTORY MICROECONOMIC ANALYSIS AND POLICY (3:3:0) Methods of economic analysis and their use; economic aggregates; price determination; theory of the firm; distribution.

4. INTRODUCTORY MACROECONOMIC ANALYSIS AND POLICY (3:3:0) National income measurement; aggregate economic models; money and income; policy problems.

14. PRINCIPLES OF ECONOMICS (3:3:0) Analysis of the American economy, emphasizing the nature and interrelationships of such groups as consumers, business, governments, labor, and financial institutions. Students who have passed Econ. 2 or are registered in the College of Business Administration may not schedule this course.

315. LABOR ECONOMICS (3:3:0) An economic analysis of the labor market. Prerequisite: Econ. 2.

## EDUCATIONAL PSYCHOLOGY (EDPSY)

14. LEARNING AND INSTRUCTION (3:3:0) Psychology of human learning applied toward the achievement of educational goals; evaluation of learning outcomes.

## EDUCATIONAL THEORY AND POLICY (EDTHP)

115. EDUCATION IN AMERICAN SOCIETY (3:3:0) Introduction to the development of educational institutions, with emphasis on historical, philosophical, and sociological forces.

## ELECTRICAL ENGINEERING TECHNOLOGY (E E)

800. APPLIED ELECTRICITY (2:1:3) Fundamentals of electric circuits; basic principles of electrical machinery and devices; electrical-mechanical analogies; beginning electronics. Prerequisite: Math. 801.

801. FUNDAMENTALS OF D.C. CIRCUITS (3:3:0) Fundamental theory of resistance, current, voltage. Direct-current circuit concepts developed from simplest series circuit through loop analysis; Thevenin's theorem. Prerequisite: Math. 801.

804. A.C. CIRCUITS (2:2:0) Application of network theorems, laws, and methods to alternating-current circuits; balanced and unbalanced polyphase systems. Prerequisite: E.E. 814.

807. A.C. AND ELECTRONICS LABORATORY (2:0:4) Laboratory study of alternating-current circuits and semiconductors; assembly and tracing of electrical and electronic circuits. Must be taken with E.E. 804 and 810. Prerequisite: E.E. 818.

809. D.C. CIRCUITS LABORATORY (2:0:4) Introduction to electrical apparatus, including instruments, their interconnection into basic circuits, observation of circuit behavior, and report writing. Must be taken with E.E. 801.

810. FUNDAMENTALS OF SEMICONDUCTORS (3:3:0) Semiconductor physics and circuit theory including hybrid parameters; equivalent circuits; power amplifiers and frequency response of small signal amplifiers. Prerequisites: E.E. 814, Math. 803.

811. MICROPROCESSORS (3:2:2) Fundamentals of microprocessors, their application, and interfacing for data processing and control. Prerequisite: E.E. 814.

813. FUNDAMENTALS OF ELECTRICAL MACHINES (3:2:2) Direct-current machinery principles and applications; introduction to machines and basic concepts of laboratory methods related to machinery studies. Prerequisites: E.E. 814, 818.



## ENGINEERING

814. **ELECTRICAL CIRCUITS (4:4:0)** Direct-current circuit analysis; introduction to basic magnetism and magnetic circuits; single-phase circuit fundamentals. Prerequisites: E.E. 801, Math. 802.
815. **A.C. MACHINERY AND CONTROL (3:3:0)** Alternating-current machinery principles and applications; survey of alternating- and direct-current machinery control methods. Prerequisites: E.E. 804, 813.
816. **LINEAR ELECTRONIC CIRCUITS (3:3:0)** Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, vacuum tubes, and operational amplifiers. Prerequisite: E.E. 817.
817. **ADVANCED ELECTRONICS (4:4:0)** Fundamentals and application of pulse and digital circuits and electronic devices, such as unijunction transistors, photo devices, and zener diodes. Prerequisite: E.E. 810.
818. **ELECTRICAL CIRCUITS LABORATORY (1:0:2)** Laboratory study of direct-current networks and alternating-current circuits. Must be taken with E.E. 814. Prerequisite: E.E. 809.
819. **A.C. MACHINERY LABORATORY (1:0:2)** Alternators, induction generators, single- and polyphase motors, synchro units; transformers, saturable reactors, and protective devices. Must be taken with E.E. 815. Prerequisite: E.E. 807.
820. **ADVANCED ELECTRONICS LABORATORY (1:0:2)** Laboratory study of solid state pulse, digital, industrial, and motor control circuits. Prerequisite: E.E. 807.
821. **LINEAR ELECTRONICS LABORATORY (1:0:2)** Laboratory study of transistors; study of differential and operational amplifiers. Emphasis is placed on circuit design. Must be taken with E.E. 816. Prerequisite: E.E. 820.
830. **SELECTED TOPICS IN ELECTRICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in electrical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING (ENGR)

2. **ENGINEERING ORIENTATION (1:0:2)** Introduction to efficient methods for analyzing and solving engineering problems.
5. **EXPERIMENTAL METHODS FOR ENGINEERS (1:0:2)** Introduction to experimental methods used in engineering. Applications of basic experimental and computational concepts through student involvement in laboratory experiments.

## ENGINEERING GRAPHICS (E G)

1. **ENGINEERING DRAWING (2:0:5)** Technical skills and drafting room practices; fundamentals of theoretical graphics; orthogonal, oblique, and perspective projections; working and schematic drawings.
3. **ARCHITECTURAL GRAPHICS (2:0:6)** Principles of architectural drawing; spatial relationships of points, lines, planes, and solids with architectural applications; shadows, perspective.
10. **INTRODUCTORY ENGINEERING GRAPHICS (1:0:3)** Multiview projections, pictorial drawings, dimensioning, engineering standards, and working drawings.
11. **ENGINEERING DESIGN GRAPHICS (1:0:3)** Introduction to creative design, space analysis, graphs, graphical mathematics, vector analysis, and design implementation. Prerequisite: E.G. 10 or 21.
12. **SPATIAL ANALYSIS (2:0:5)** Spatial relations of points, lines, and solids, with engineering applications. Prerequisite: 1 credit of introductory graphics.
50. **ENGINEERING METHODS AND GRAPHICAL COMMUNICATION (3:1:5)** Introduction to engineering through experimental methods of measurement and graphical expressions; multiviews, pictorials, dimensioning, space analysis, graphical mathematics, laboratory experience.
800. **DRAWING ROOM STANDARDS AND PRACTICES (2:0:6)** Interpretation of various types of engineering drawings, including dimensional systems, symbols, and American standard drafting room practices. Prerequisite: E.G. 10.

803. **ADVANCED ENGINEERING DRAWING (3:1:5)** Application of principles of engineering drawing, including auxiliary views in the layout of detail, assembly, and working drawings. Prerequisite: E.G. 1.

830. **SELECTED TOPICS IN ENGINEERING GRAPHICS (1-3)** Individual or group work in engineering graphics offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## ENGINEERING MECHANICS (E MCH)

11. **STATICS (3:3:0)** Equilibrium of coplanar force systems; analysis of frames and trusses; noncoplanar force systems; friction; centroids and moments of inertia. Prerequisite or concurrent: Math. 162.

12. **DYNAMICS (3:3:0)** Motion of a particle; relative motion; kinetics of translation, rotation, and plane motion; work-energy; impulse-momentum. Prerequisites: E.Mch. 11, Math. 250.

13. **STRENGTH OF MATERIALS (3:3:0)** Axial stress and strain; torsion; stresses in beams; elastic curves and deflections of beams; combined stress; columns. Prerequisite: E.Mch. 11.

215. **MECHANICAL RESPONSE OF ENGINEERING MATERIALS (2:2:0)** Mechanical response measures and design theories for engineering materials; elastic and plastic response as affected by stress, strain, time, temperature. Prerequisite: E.Mch. 13.

810. **BASIC MECHANICS (2:2:0)** Forces; moments; resultants; equilibrium of force systems; introduction to dynamics. Prerequisite: Math. 801.

811. **ELEMENTARY MECHANICS (3:3:0)** Forces; moments; resultants; equilibrium of force systems; friction; centroids and moment of inertia of areas; dynamics of particles. Prerequisite: Math. 801.

812. **INTRODUCTION TO DYNAMICS (3:2:2)** Absolute and relative motion related to particles and simple linkages. Force-mass-acceleration, work-energy, and impulse-momentum solution techniques. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Math. 803.

813. **STRENGTH AND PROPERTIES OF MATERIALS (3:3:0)** Axial stress and strain; shear; riveted and welded connections; torsion; beam stresses and deflections; combined axial and bending stresses; columns, ductility, resilience, and toughness. Prerequisite: E.Mch. 811.

## ENGLISH (ENGL)

4. **BASIC WRITING SKILLS (3:3:0)** Intensive practice in writing sentences and paragraphs and instruction in grammar, usage, and punctuation. Designed for students with deficient preparation. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*

5. **WRITING TUTORIAL (1:0:1)** Tutorial instruction in composition and rhetoric for students currently enrolled in Engl. 10 or 20. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*

10. **COMPOSITION AND RHETORIC I (3:3:0)** Organizing and writing clear expository essays. Prerequisite: Engl. 4 or satisfactory performance on English Proficiency Examination.

20. **COMPOSITION AND RHETORIC II (3:3:0)** Building and presenting cogent written arguments, with attention to style. Prerequisite: Engl. 10.

30. **HONORS FRESHMAN COMPOSITION (3:3:0)** Writing practice for specially qualified and screened students. Students who are exempt from Engl. 10 and have passed a special writing test will qualify for this course.

101. **INTRODUCTION TO LITERATURE (3:3:0)** Selected readings in types of literature: short story, novel, essay, poetry, and drama. Not recommended for majors. Prerequisite or concurrent: Engl. 20 or 30.

102. **GREAT BOOKS OF BRITISH LITERATURE (3:3:0)** Introduction to British literature through the reading and discussion of significant works. Intended for nonmajors.

103. **GREAT BOOKS OF AMERICAN LITERATURE (3:3:0)** Introduction to American literature through the reading and discussion of significant works. Intended for nonmajors.

## FILM

104. THE ENGLISH BIBLE (3:3:0) History of the English Bible and its antecedents; study of the Bible as a cultural and literary document. Prerequisite or concurrent: Engl. 20 or 30.
117. TECHNICAL WRITING (3:3:0) The writing of technical reports. Primarily for juniors and seniors in technical and scientific majors. Prerequisite: Engl. 20 or 30.
119. BUSINESS WRITING (3:3:0) Writing reports and other common forms of business communication. Prerequisite: Engl. 20 or 30.
129. SHAKESPEARE (3:3:0) A selection of the major plays studied to determine the sources of their permanent appeal. Not recommended for English majors. Prerequisite or concurrent: Engl. 20 or 30.
133. MODERN AMERICAN LITERATURE TO WORLD WAR II (3:3:0) Eliot, Frost, Faulkner, Fitzgerald, Hemingway, O'Neill, and other writers representative of the years between the world wars. Prerequisite or concurrent: Engl. 20 or 30.
139. BLACK AMERICAN LITERATURE (3:3:0) Fiction, poetry, and drama, including such writers as Baldwin, Douglass, Ellison, Morrison, and Wright.
140. CONTEMPORARY LITERATURE (3:3:0) Representative fiction, essays, poetry, and drama by such writers as Barth, Bellow, Lowell, Mailer, Beckett, Durrell, and Pinter. Prerequisite or concurrent: Engl. 20 or 30.
165. THE DEVELOPMENT OF THE ENGLISH NOVEL (3:3:0) Origins and backgrounds of the English novel; selected works from Defoe to the present. Prerequisite or concurrent: Engl. 20 or 30.
167. POETRY (3:3:0) Introduction to the appreciation and analysis of English and American poetry.
168. DRAMA (3:3:0) Introduction to the range of dramatic expression in selected plays, primarily English and American.
184. (C.Lit. 184) THE SHORT STORY (3:3:0) Lectures, discussion, readings in translation, with emphasis on major writers of the classical, medieval, Renaissance, and modern periods.
185. (C.Lit. 185) THE MODERN EUROPEAN NOVEL (3:3:0) Development of the European novel in the last hundred years; lectures, discussion, readings in translation, with emphasis on major novelists.
189. (C.Lit. 189) FOUNDATIONS OF MODERN DRAMA (3:3:0) Playwrights who set the world's stage for twentieth-century drama: Ibsen, Shaw, Chekhov, and Strindberg.
191. SCIENCE FICTION (3:3:0) Science fiction as the literature of technological innovation and social change—its development, themes, and problems.
192. THE LITERATURE OF FANTASY (3:3:0) Major realms of fantasy in English and American literature: daydream and nightmare, the pastoral, dystopia, utopia, apocalypse, and the heroic.
194. WOMEN WRITERS (3:3:0) Short stories, novels, poetry, drama, and essays by major English and American women writers since 1870.
196. (Folk. 196) ESSENTIALS OF ANGLO-AMERICAN FOLKLORE (3:3:0) A basic introduction to verbal and nonverbal folklore, stressing the basic procedures of collection, classification, and analysis. Prerequisite or concurrent: Engl. 20 or 30.
197. AMERICAN FOLK SONG IN THE ENGLISH (3:3:0) British songs in America; native repertoires, white and Negro; folk ballad; and musical development.
297. SPECIAL TOPICS (1-6)
826. REPORT WRITING (3:3:0) Interpretation of statistical data and writing of technical reports. Prerequisite: Engl. 4 or 10.

## FILM (FILM)

190. THE ART OF THE CINEMA (3:3:0) The development of cinema to its present state; principles of evaluation and appreciation; examples from the past and present.



## FINANCE (FIN)

100. **INTRODUCTION TO FINANCE (3:3:0)** The nature, scope, and interdependence of the institutional and individual participants in the financial system. May not be scheduled by College of Business Administration students. Prerequisite: seventh-term standing.
108. **PERSONAL FINANCE (3:3:0)** Personal management of budgets, bank accounts, loans, credit buying, insurance, real estate, and security buying. May not be scheduled by College of Business Administration students. Prerequisite: fourth-term standing.
210. **COMMERCIAL BANK MANAGEMENT (3:3:0)** Fundamental principles underlying management of a commercial bank; capital funds; asset and liability management; value maximization; legal and operational constraints. Prerequisite: Fin. 105.

## FOOD SERVICE AND HOUSING ADMINISTRATION (FS HA)

102. **INTRODUCTION TO FOOD SERVICE AND HOUSING ADMINISTRATION (3:3:0)** Professional duties of management personnel in large food and housing operations, their working conditions, and organizations which they serve.
103. **INTRODUCTION TO HEALTH FACILITIES FOOD SERVICE ADMINISTRATION (3:3:0)** Professional functions of the hospital food service system, relationships with the nutrition component of food service system, and organization served.
225. **FOOD AND LABOR MANAGEMENT AND CONTROL (3:3:0)** Techniques for analyzing and controlling costs in hospitality organizations. Prerequisite: 3 credits in accounting.
295. **IN-SERVICE TRAINING (1:1:0)** Eight weeks or 300 hours of practical experience in operations of the type in which the student is majoring.
320. **HOSPITALITY INDUSTRY EQUIPMENT AND UTILITIES (3:3:0)** Principles governing the purchase, use, and operation of heating, plumbing, refrigeration, air conditioning, and other equipment and utilities.
321. **HOSPITALITY INDUSTRY MAINTENANCE (2:2:0)** Maintenance management in hospitality operations.

## FORESTRY (FOR)

203. **FIELD DENDROLOGY (2:0:6)** Identification of trees and shrubs by leaf, fruit, bud, twig, and bark.
220. **FOREST ECOSYSTEM PROTECTION (3:3:0)** Basic biological, physical, sociological, and management concepts involved in protecting the forest ecosystem from wild fire, insects, and disease.
221. **FOREST FIRE TECHNOLOGY (1:0:3)** Technological aspects of controlling and using fire in the forest environment. Prerequisite: For. 220.
240. **SILVICULTURAL PRACTICES (3:2:3)** Principles and techniques of forest establishment, culture, regeneration, and harvesting. Prerequisite: For. 203.
241. **AERIAL PHOTO INTERPRETATION (4:2:6)** Aerial photo interpretation techniques applied to land management inventories, mapping, road location, and procurement. Prerequisites: For. 203; 804 and 806, or 366.
242. **ELEMENTS OF PROJECT SUPERVISION IN FORESTRY (3:3:0)** Supervisory techniques developed through an understanding of the behavioral sciences applied to field forestry personnel management.
804. **FOREST MENSURATION (3:2:3)** Measurement of forests and forest products.
806. **FOREST INVENTORIES (3:2:3)** Application of land surveying and sampling techniques, including statistical analysis, for the determination of timber volume and growth.
807. **FOREST RECREATION (3:2:3)** Development, construction, and management of forest recreation areas and facilities. Prerequisite: For. 815.
808. **FOREST PROTECTION (3:2:3)** Forest fire prevention, detection, behavior, and suppression; fire plans and statistics; insect and disease control.



## FRENCH

809. FOREST VALUATION (3:2:3) Determination of forest values through a consideration of markets, logging and milling costs, stumpage appraisals, and other forest values. Prerequisite: For. 806.
810. FOREST IMPROVEMENTS (3:2:3) Use of materials and equipment in developing, operating, and maintaining the forest property.
814. FORESTRY LEADERSHIP PRACTICUM (1:0:3) Leadership techniques applied to standard forestry field operations. Prerequisite or concurrent: For. 812.
815. FOREST SURVEYING I (3:2:3) Basic plane surveying techniques as applied to forestry practices. Prerequisite or concurrent: Math. 801.
816. FOREST SURVEYING II (3:2:3) Standard mapping techniques as applied to field forestry situations. Prerequisite: For. 815.
817. URBAN FORESTRY (3:2:3) The application of land treatment techniques and forestry practices to urban environments. Prerequisites: For. 802, 807.
818. INDIVIDUAL STUDIES (1-3 per term) Individual study of forest technology.
820. ADVANCED FOREST MEASUREMENTS (1) Application of point and 3P sampling methods as a means of developing the data base for integrated forest management planning. Prerequisites: For. 809, 816, 826.
821. FIELD STUDIES IN ECOLOGY (1) Field studies in ecological problems, challenges, and impacts related to normal forest practices in general resource management. Prerequisites: For. 809, 816, 826.
822. FOREST MANAGEMENT SYSTEMS (1) Field projects in the integrated application of silvicultural, mensurational, and financial principles in forest management planning. Prerequisites: For. 809, 816, 826.
824. INTRODUCTION TO HARVESTING (1:0:3) Practical instruction in the use and maintenance of hand tools and small power tools used in logging operations.
825. HARVESTING TECHNIQUES (1:0:3) Practical instruction in the operation of heavy equipment used in timber harvesting. Prerequisite: For. 824.
826. REFORESTATION AND INTERMEDIATE OPERATIONS (1:0:3) Field practicum in planting, pruning, thinning forest stands. Prerequisite: For. 825.
827. FIELD STUDY PREPARATION (1) Developing practices, procedures, and materials for conducting integrative field studies. Prerequisites: For. 241, 802, 809, 815.

## FRENCH (FR)

1. ELEMENTARY FRENCH (4:3:2) Grammar, with reading and writing of simple French; oral and aural work stressed.
2. ELEMENTARY FRENCH (4:3:2) Grammar and reading continued; oral and aural phases progressively increased. Prerequisite: Fr. 1.
3. INTERMEDIATE FRENCH (4:3:2) Grammar, reading, composition, oral and aural exercises. Prerequisite: Fr. 2.
140. FRENCH NOVEL IN ENGLISH TRANSLATION (1-6) Readings of selected French masterpieces in translation; discussion of recurring themes in several literary periods.

## GEOGRAPHY (GEOG)

20. MAN'S WORLD: AN INTRODUCTION TO MODERN HUMAN GEOGRAPHY (3:3:0) Spatial perspective on human societies in a modernizing world; regional examples; use of space and environmental resources; elements of geographic planning.
24. ELEMENTS OF CULTURAL GEOGRAPHY (3:3:0) Locational analysis of changes in non-Western cultures. Problems of plural societies, economic development, population growth, and settlement.
26. HUMAN GEOGRAPHY (3:3:0) Introduction to concepts, principles, and theories of spatial organization.

## GEOSCIENCES (GEOSC)

- \*1. **PHYSICAL GEOLOGY (3:2:3)** Earth processes and their effects on the materials, structure, and morphology of the earth's crust. Practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps.
- \*20. **OUR EARTH (3:2:2)** Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation.
- \*21. **EARTH HISTORY (3:2:2)** Evolution of the earth; changing patterns of mountains, lowlands, and seas; development of living organisms. Practicum includes field trips, studies of geologic maps, geologic problems, fossils.

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\*This course includes from one to several field trips for which an additional charge will be made to cover transportation.

## GERMAN (GER)

- 1. **BASIC GERMAN (3:3:0)** Listening, speaking, reading, writing; introduction to basic structures and vocabulary through dialogs and literary-cultural readings.
- 2. **BASIC GERMAN (3:3:0)** Listening, speaking, reading, writing; further study of basic structures and vocabulary through dialogs and literary-cultural readings. Prerequisite: Ger. 1.
- 3. **INTERMEDIATE GERMAN (3:3:0)** Continued skill development; readings consisting of short literary and journalistic writings; increased attention to German cultural context. Prerequisite: Ger. 2 or 12.
- 4. **INTERMEDIATE GERMAN (3:3:0)** Continued skill development; readings consisting of short stories, short plays, poems, articles; German in its cultural context. Prerequisite: Ger. 3.
- 100. **GERMAN CULTURE AND CIVILIZATION (3:3:0)** Life of the German people from the early Middle Ages to modern times; their literature and arts, music, science, and philosophy.

## HEALTH EDUCATION (HL ED)

- 19. **MAN AND DISEASE (1:1:0)** Essentials of communicable and chronic disease control.
- 45. **ALCOHOL AWARENESS EDUCATION (1:1:0)** A course designed to raise awareness relative to the use and abuse of beverage alcohol.
- 46. **INTRODUCTION TO HEALTH ASPECTS OF HUMAN SEXUALITY (1:1:0)** An examination of health concerns related to sexuality and sexual behavior.
- 57. **CONSUMER HEALTH (1:1:0)** Essentials for determining credibility of claims for particular health services and products from a consumer's perspective.
- 303. **EMERGENCY CARE (2:1:2)** Competencies leading to American Red Cross Advanced First Aid and Emergency Care and American Heart Association Cardiopulmonary Resuscitation certification.
- 384. **APPLIED KINESIOLOGY (3:2:2)** Study of anatomical structure, body movement. Characteristic muscle action and motion will be analyzed in relation to physical therapy context. Prerequisite: Biol. 29.
- 800. **PHYSICAL THERAPY ASSISTANT — INTRODUCTION (3:2:2)** Orientation to the field of physical therapy, historical background of the profession, professional ethics, medical terminology, and patient transportation techniques.
- 801. **PHYSICAL THERAPY ASSISTANT — PROCEDURES I (3:2:2)** Physiological effects of heat, cold, and massage; current treatment modalities in patient rehabilitation will be examined and discussed. Prerequisite: HL.Ed. 800.
- 802. **PHYSICAL THERAPY ASSISTANT — PROCEDURES II (3:2:2)** Development of skills in the application of diathermy, ultra-sound, electric stimulation, intermittent pelvic and cervical traction, and ultra-violet. Prerequisite: HL.Ed. 801.
- 803. **MEDICAL SURGICAL ORIENTATION TO THERAPY (3:3:0)** Introduction to medical and post-operative conditions and/or disease states most frequently treated by physical therapy modalities. Prerequisites: Biol. 29, 41, 42.

## HISTORY

804. THERAPEUTIC EXERCISE (3:2:4) Introduction to the principles of exercise in the treatment of disease and injury.
805. PHYSICAL THERAPY ASSISTANT—REHABILITATION (3:2:2) Development of techniques and practical experience with appliances used in the rehabilitation of the physically disabled.
806. PHYSICAL THERAPY ASSISTANT — PRACTICUM (10) The practice of physical therapy assistant skills in a clinical setting under the direct supervision of a registered physical therapist. Prerequisites: HL.Ed. 802, 804, 805.

## HISTORY (HIST)

12. HISTORY OF PENNSYLVANIA (3:3:0) Chronological and topical survey emphasizing immigration of diverse ethnic groups, religious, political, economic, and social developments, including industrialization and urbanization.
16. INTRODUCTION TO THE HISTORY OF THE ANCIENT WORLD (3:3:0) Civilization of the ancient Mediterranean world from primitive man to the decline of the Roman Empire.
17. INTRODUCTION TO THE HISTORY OF THE MIDDLE AGES (3:3:0) Rise and development of the civilization of medieval Europe from the decline of Rome to 1500.
18. MODERN EUROPE 1500-1815 (3:3:0) Renaissance and Reformation; rise of national states; overseas expansion; development of science; decline of feudalism; French Revolution and Napoleonic era.
19. MODERN EUROPE, 1815 TO THE PRESENT (3:3:0) Growth of European democracy; scientific progress; Italian and German unification; Industrial Revolution; imperialism; the world wars; search for security and stability; Fascism and Communism.
20. HISTORY OF THE UNITED STATES TO 1865 (3:3:0) Introductory survey including the colonial background and emphasizing the impact of nationalism and sectionalism on American political, economic, social, and cultural development.
21. HISTORY OF THE UNITED STATES SINCE 1865 (3:3:0) Integrated survey emphasizing the emergence of a dominantly urban-industrial society; expanded role of government; America's increasing involvement in world affairs.
22. LATIN-AMERICAN HISTORY TO 1820 (3:3:0) Conquest of New World, development of colonial institutions, impact on native cultures, and origins of independence movements.
23. LATIN-AMERICAN HISTORY SINCE 1820 (3:3:0) Origin, political growth, international relations, and economic status of the Latin-American republics with emphasis upon present-day conditions.
30. ANCIENT GREECE (3:3:0) Greek world from the earliest Aegean cultures to the death of Alexander the Great and the beginnings of Hellenistic civilization.
112. COLONIAL PENNSYLVANIA (3:3:0) Development of the colony of Pennsylvania through the War for American Independence, covering immigration, economics, politics, religion, and society.
141. MEDIEVAL AND MODERN RUSSIA (3:3:0) Introductory survey including political, social, economic, and cultural development of Kievan, Muscovite, and Imperial Russia.
142. HISTORY OF COMMUNISM (3:3:0) Marxism; Leninism and evolution of the Soviet Union; formation and development of the Communist bloc; impact of Chinese Communism.
143. HISTORY OF FASCISM AND NAZISM (3:3:0) The study of right-wing totalitarianism in the twentieth century with special emphasis on Fascist Italy and Nazi Germany.
151. TECHNOLOGY AND SOCIETY IN AMERICAN HISTORY (3:3:0) Development of technology in America from colonial times; its reception and its influence on social, economic, and political life.
152. AFRO-AMERICAN HISTORY (3:3:0) African roots; colonial and revolutionary experiences; slavery and abolitionism; civil war and reconstruction; accommodation and protest; the new militancy.
154. HISTORY OF WELFARE IN AMERICA (3:3:0) History of the care of dependent people (including children, the aged, mentally ill, unemployed) from colonial times to the present.
155. AMERICAN BUSINESS HISTORY (3:3:0) The development of business from the planting of the colonies, through the stages of industrialization, to the present.



- 156. (L.S. 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.
- 158. HISTORY OF AMERICAN IMMIGRATION (3:3:0) The waves of migration to America and an analysis of the resulting minority groups, their reception, assimilation, and persisting identity.
- 171. HISTORY OF MODERN SOUTHEAST ASIA (3:3:0) Sociopolitical survey of Southeast Asian history emphasizing the modern period. Origins of traditional civilization, colonialism and nationalism, problems of independence.
- 174. THE HISTORY OF TRADITIONAL EAST ASIA (3:3:0) Comparative cultural, institutional, and social history of traditional China and Japan to their contact with the industrialized West.
- 175. THE HISTORY OF MODERN EAST ASIA (3:3:0) Comparative survey of the internal developments and external relations of China and Japan since their contact with the industrialized West.
- 191. EMERGING AFRICA (3:3:0) Indigenous African societies; impact of Rome, Islam, and Europe; slave trade; colonialism; nationalism; problems since independence.
- 195. HISTORY OF CANADA (3:3:0) An integrated survey from French colonial beginnings to modern Dominion status, with special emphasis on relations with the United States.

## HOTEL AND FOOD SERVICE (H F S)

- 802. SANITATION AND HOUSEKEEPING (3:3:0) Practical applications of sanitation principles to food service and housing delivery systems; organization and work methods in the housekeeping function.
- 804. HOTEL AND FOOD SERVICE MERCHANDISING (3:3:0) Merchandising as a system distributing benefits, collecting costs, concerned with motivating consumers. Topics include promotion, menu planning, and research methods.
- 805. TRAINING AND SUPERVISION (3:3:0) Methods and techniques of training and supervising food service and housing employees for overall efficiency of operation.
- 810. FOODS EXPERIENCE (4:3:2) Theory, observation, and practice in food services; emphasis on planning, preparation, and service in commercial food operations.
- 850. FOOD SERVICE DELIVERY SYSTEMS (4) Physical characteristics of principal food product groups considered. Topics include purchasing problems, preparation techniques, quality and cost control. Prerequisites: Acctg. 101, F.S.H.A. 225.
- 860. FOOD SERVICE SUPERVISION (4) The principal food service administrative routines are considered from the point of view of the supervisor and middle manager. Prerequisite: H.F.S. 850.
- 870. FOOD AND BEVERAGE ADMINISTRATION (4) Components of food service systems are identified and studied as separate problems and as a total system. Prerequisite: H.F.S. 860.
- 875. HOSPITAL FOOD OPERATING SYSTEMS (4) Consideration of hospital food service system as determined by patient needs, physical plant, operating policies, cost constraints, and quality standards. Prerequisite: H.F.S. 860.

## HUMAN DEVELOPMENT (H DEV)

- 100. INTRODUCTION TO HUMAN DEVELOPMENT (1:1:0) Human development as a process of man-environment transactions, and the relationships of various fields to the study of that process.
- 200. EMPIRICAL INQUIRY IN HUMAN DEVELOPMENT (3:3:0) Introduction to methods and philosophy of empirical inquiry applied to problems of human development.
- 395. FIELD PROJECTS (1-12) Independent study and research in a human service program; written and oral summary of rationale, procedures, findings.



## HUMANITIES (HUMAN)

1. VALUES OF THE WESTERN CULTURAL HERITAGE (3:3:0) Fundamental values of human experience as expressed in outstanding philosophical and literary works.
2. SHAPING OF THE MODERN MIND (3:3:0) Relevance to the present age of influential literary and philosophical texts illustrative of the principal epochs of Western civilization.
21. IDEAS AND ARTS (3:3:0) Interaction of intellectual and aesthetic values from the Renaissance to the present.
50. THE LITERATURE AND LORE OF MINING (3:3:0) Experience and values of mining tradition: survey of the literature and lore, including fields.
101. MODERN SCIENCE AND HUMAN VALUES (3:3:0) Relationships of science to the aspirations, values, and arts of man.

## INDIVIDUAL AND FAMILY STUDIES (I F S)

16. EFFECTIVE INTERPERSONAL SKILLS (1:1:0) Training in interaction skills required for the development and maintenance of satisfying interpersonal relationships.
129. INTRODUCTION TO INDIVIDUAL AND FAMILY DEVELOPMENT (3:3:0) Introduction to psychosocial and family development at all stages of the individual and family life cycle.
319. FAMILY FINANCIAL MANAGEMENT (3:3:0) How families plan their finances and factors that determine their decisions.
329. INFANCY AND EARLY CHILDHOOD (3:3:0) Theories, research findings, and methods in social/behavioral/biological sciences related to developmental processes and intervention during infancy/early childhood. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.
339. LATER CHILDHOOD AND ADOLESCENCE (3:3:0) Physical growth, development, and maturational processes. Agencies of socialization and adjustment systems in development, age six through adolescence. Prerequisite: I.F.S. 129 or Soc. 1 or Psy. 2.
349. ADULT DEVELOPMENT AND AGING (3:3:0) Physiological, psychological, and social development and change from young adulthood through old age; characteristic problems of the individual. Prerequisite: I.F.S. 120 or Psy. 2 or Soc. 1.

## INDUSTRIAL ENGINEERING (I E)

315. INDUSTRIAL ORGANIZATION AND ADMINISTRATION (3:3:0) Fundamental principles of organization leading to intelligent appreciation of the simpler problems of factory organization and operation. Students registered in industrial engineering may not schedule this course.

## INDUSTRIAL ENGINEERING TECHNOLOGY (I E)

805. ECONOMICS OF INDUSTRY (2:2:0) Internal economics of industrial enterprise, cost factors, and methods of comparing alternate proposals.
809. INSPECTION AND QUALITY CONTROL (3:2:2) Inspection methods and procedures and their applications to control and acceptance sampling based on statistical methods. Prerequisite: Math. 802.
811. MANUFACTURING MATERIALS AND PROCESSES (3:2:3) Mechanical properties of materials; primary processing methods used in manufacturing, emphasizing ferrous metals, their relationship to other metals and nonmetals.
812. MANUFACTURING PROCESSES (3:1:6) Technology related to metal removal, dimensional inspection, metal joining, hot and cold forming heat treating, metal casting, properties of materials. Prerequisite: I.E. 811.
815. PRODUCTION DESIGN (3:1:6) The planning, designing, and specifying of both standard and special tools required for the production of manufactured goods. Prerequisites: E.G. 803, I.E. 812.

## INSURANCE (INS)

100. **RISK AND INSURANCE (3:3:0)** Introduction to the principles and methods of handling business and personal risks; emphasis on insurance techniques. Prerequisite: fifth-term standing.
102. **PERSONAL INSURANCE PLANNING (3:3:0)** Introduction to the principles and practices of personal insurance planning. May not be scheduled by College of Business Administration students. Prerequisite: fourth-term standing.
800. **INSURANCE PRINCIPLES (3:3:0)** Introductory survey of all lines of insurance for handling business and personal risks.
810. **LIFE INSURANCE (3:3:0)** The life insurance contracts as methods of treating the problems of premature death and superannuation. Prerequisite: Ins. 800.
820. **PROPERTY AND CASUALTY INSURANCE (3:3:0)** Fundamental principles of property and casualty insurance. Prerequisite: Ins. 800.
830. **INSURANCE PRACTICUM (3:3:0)** Practical introduction to insurer operations in company and agency offices. Prerequisite: Ins. 820.

## INTERNATIONAL BUSINESS (I B)

862. **INTERNATIONAL BUSINESS (3:3:0)**

## INTERNATIONAL UNDERSTANDING (INT U)

200. **INTERNATIONAL UNDERSTANDING AND WORLD AFFAIRS (3:3:0)** Interdisciplinary consideration of international problems, conflict and accommodation; impact of various cultures and ideologies on world affairs and foreign policy. Credit will not be given for both this course and Pl.Sc. 14. Prerequisite: fourth-term standing.

## JOURNALISM (JOURN)

200. **THE MASS MEDIA AND SOCIETY (3:3:0)** Mass communications in the United States; organization, role, content, and effects of newspapers, magazines, television, radio, books, and films. Not intended for students in the School of Journalism.
800. **HISTORY AND SURVEY OF MASS COMMUNICATIONS (3:3:0)** History and role of mass media and advertising in society; nature of newspaper, magazine, broadcasting, book, and motion picture industries.
801. **BEGINNING NEWS WRITING (3:1:4)** Techniques of news writing with emphasis on organizing the story. Detailed critiques and class discussion of student writing. Prerequisites: Engl. 4, Journ. 800, ability to type.
802. **BEGINNING REPORTING (3:1:4)** The techniques of gathering news; problems of taste, ethics, and legality in reporting the news; community reporting assignments. Prerequisite: Journ. 801.
803. **FUNDAMENTALS OF EDITING (3:1:4)** Techniques of editing material for publication; printing processes; copyreading; headline writing; typography; picture editing; layout; legal and ethical considerations. Prerequisite: Journ. 802.
804. **REPORTING THE COMMUNITY (3:0:9)** Practicum in newspaper reporting, editing, and production. Prerequisite: Journ. 803.
811. **ADVERTISING COPYWRITING (3:1:4)** Techniques of writing advertising headlines and copy, with emphasis on spelling, grammar, and word choice. Detailed critiques of student writing. Prerequisite: Journ. 800.
812. **ADVERTISING LAYOUT (3:1:4)** Print advertisement design and production, including typography, plate making, mat services, shop procedures, etc.; detailed critiques of layouts; field trips. Prerequisite: Journ. 800.

## LABOR STUDIES

813. ADVERTISING MEDIA AND CAMPAIGNS (3:1:4) Media selection and coordination, creative strategy, and campaign execution. Each student plans and produces a complete advertising campaign. Prerequisites: Journ. 811, 812.
814. NEWSPAPER ADVERTISING (3:0:9) Management of the newspaper advertising department, advertising sales promotion, preparing the sales presentation, dealing with the advertiser, advertising page make-up. Prerequisite: Journ. 813.
820. NEWSPAPER MANAGEMENT (3:3:0) Managing and publishing newspapers in the United States; problems of law, finance, personnel, promotion, technological change, and community service. Prerequisite: Journ. 803 or 813.

## LABOR STUDIES (L S)

100. INDUSTRIAL RELATIONS (3:3:0) Introductory analysis of the employment relationship and of the interrelated interests of managements, workers, unions, and the public.
102. STRUCTURE AND FUNCTION OF UNIONS (3:3:0) A study of the internal structure, goals, and impact on society of unions.
103. LABOR LEGISLATION (3:3:0) A study of legislation regulating the functioning of trade unions.
104. THE PRACTICE OF COLLECTIVE BARGAINING (3:3:0) A study of the process of collective bargaining, the issues in collective bargaining, and bargaining relationships.
156. (Hist. 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.
296. INDEPENDENT STUDIES (1-12)

## LIBRARY STUDIES (L ST)

1. INTRODUCTION TO THE USE OF THE LIBRARY (3:2:2) Use of the card catalog, periodical indexes, and reference books; test problems and bibliographies.

## MANAGEMENT (MGMT)

100. SURVEY OF MANAGEMENT (3:3:0) Introduction to organizational factors relevant to management processes, including leadership, motivation, job design, technology, organizational design and environments, systems, change. For nonbusiness students only.
801. PRINCIPLES OF MANAGEMENT (3:3:0) Prerequisite: Mgmt. 100.
802. SUPERVISORY MANAGEMENT (3:3:0) Preparation for supervisory positions in formal organizations. Emphasis placed on the motivational aspects of the supervisor's job. Prerequisite: Mgmt. 100.

## MAN-ENVIRONMENT RELATIONS (M E R)

213. PRINCIPLES OF CLOTHING I (2:2:0) Analysis of aesthetic, functional, and socio-psychological factors related to clothing needs and usage.
214. PRINCIPLES OF CLOTHING II (2:2:0) Current cultural influences on the designer, design media, and construction processes in the mass production technology of clothing. Prerequisite: M.E.R. 213.
215. CLOTHING CONSTRUCTION (1-4) Experimentation with construction techniques for selected fabrics and design requirements. Prerequisite or concurrent: M.E.R. 213, or consent of instructor.
301. ELEMENTARY TEXTILES (3:2:2) Recognition, use, and care of textiles related to characteristics of fibers, yarns, fabric construction, and finishes. Prerequisite: Chem. 11 or Ph.Sc. 8.



## MARKETING (MKTG)

120. **SALESMANSHIP (3:3:0)** Basic principles underlying all types of selling and the practical application of these principles to various selling situations. Prerequisite: fourth-term standing.
121. **CONTEMPORARY AMERICAN MARKETING (3:3:0)** Social and economic aspects; movement of goods and services from producers to consumers; analysis of marketing functions, systems, and institutions. Prerequisite: 3 credits in economics. Students who have passed Mktg. 122 may not schedule this course.
801. **PRINCIPLES OF MARKETING (3:3:0)** Prerequisite: Mktg. 121.
802. **PROMOTION MANAGEMENT (3:3:0)** The application and management of various forms of persuasive communication with potential customers; personal selling, sales management, advertising, sales promotion. Prerequisite: Mktg. 801.
803. **PRINCIPLES OF RETAILING (3:3:0)** Introduction to the management of retailing organizations, with emphasis on decision making. Not open to retailing majors.
804. **PRINCIPLES OF RETAILING SALESMANSHIP (3:3:0)** Principles of selling applied to the retail level of trade; practical application of these principles in various sales situations.
805. **RETAILING I (3:3:0)** An analysis of the management and merchandising policies of various types of retailing institutions.
806. **RETAILING II (3:3:0)** Merchandising, promotion, and control policies of retail store management. Prerequisite: Mktg. 805.
807. **INTRODUCTION TO MARKETING RESEARCH (3:3:0)** Managerial aspects of marketing research, with emphasis on practical details of operating a small-scale project. Prerequisites: Mktg. 121, Q.B.A. 801.
808. **PRINCIPLES OF EFFECTIVE PURCHASING (3:3:0)** Introduction to the purchasing function in organizations, with emphasis on integration of purchasing activity with other aspects of marketing management. Prerequisite: Mktg. 121.
809. **PRODUCT PLANNING AND DEVELOPMENT (3:3:0)** Problems faced by the product or branch manager including those of planning, research, and consumer satisfaction. Prerequisite: Mktg. 121.
810. **PRINCIPLES OF INDUSTRIAL MARKETING (3:3:0)** Introduction to the management of industrial marketing strategy. Emphasizes strategic response to industrial marketing opportunities and response to competition. Prerequisite: Mktg. 121.

## MATHEMATICS (MATH)

4. **INTERMEDIATE ALGEBRA (3:3:0)** Polynomials, fractions, exponents, radicals, first- and second-degree equations and inequalities, sequences, systems of equations. Limited to students indicating deficiencies on the mathematics (algebra) proficiency examination. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*
5. **COLLEGE ALGEBRA I (3:3:0)** Polynomial and rational expressions; exponents and radicals; equations and inequalities; functions, relations, and their graphs. Prerequisite: Math. 4 or satisfactory performance on the mathematics (algebra) proficiency examination.
6. **PLANE TRIGONOMETRY (3:3:0)** Trigonometric functions; solutions of triangles; trigonometric equations; identities, complex numbers. Prerequisites: Math. 5 or satisfactory performance on the mathematics (algebra) proficiency examination; 1 unit of geometry.
10. **PRECALCULUS MATHEMATICS (3:3:0)** Polynomial expressions; simultaneous equations; exponents, logarithms, binomial theorem; polynomial roots; trigonometric functions; right triangles; identities, lines, and conic sections. Limited to students whose scores on the algebra and trigonometry proficiency examination indicate a need for this course.
17. **FINITE MATHEMATICS (3:3:0)** Introduction to logic, sets, probability. Prerequisite: 3 units of high school mathematics.
18. **ELEMENTARY LINEAR ALGEBRA (3:3:0)** Matrices and vectors; transformations; systems of linear equations; convex sets and linear programming. Prerequisite: 3 units of high school mathematics.



## MECHANICAL ENGINEERING TECHNOLOGY

35. GENERAL VIEW OF MATHEMATICS (3:3:0) Survey of mathematical thought in logic, geometry, combinatorics, and chance.
36. INSIGHTS INTO MATHEMATICS (3:3:0) Examples of mathematical thought in number theory, topology, theory of symmetry, and chance. Prerequisite: one unit of algebra or Math. 4.
120. TECHNIQUES OF CALCULUS I (3:3:0) Functions and graphs, derivatives, applications. Students may take only one course for credit from Math. 65, 120, 161, 161A. Prerequisite: a satisfactory score on the algebra proficiency examination or, in the case of an unsatisfactory score, the course(s) necessary to make up the deficiencies.
121. TECHNIQUES OF CALCULUS II (3:3:0) Derivatives, integrals, applications, linear algebra. Students may take only one course for credit from Math. 66, 121, 162. Prerequisite: Math. 120.
161. ELEMENTARY CALCULUS WITH ANALYTIC GEOMETRY I (3:3:0) Derivatives, differentials, applications; integrations, applications; analytic geometry. Students may take only one course for credit from Math. 120, 161, 161A. Prerequisite or concurrent: satisfactory scores on both the algebra and trigonometry proficiency examinations or, in the case of unsatisfactory scores, the course(s) necessary to make up the deficiencies.
162. ELEMENTARY CALCULUS WITH ANALYTIC GEOMETRY II (3:3:0) Derivatives, integration, applications, analytic geometry, infinite series. Students may take only one course for credit from Math. 121, 162. Prerequisite: Math. 161.
200. NUMBER SYSTEMS (3:3:0) Introduction to sets and logic, properties of the natural numbers, integers, rational and real numbers, algorithms, applications to geometry. For elementary education students only.
240. INTERMEDIATE CALCULUS WITH APPLICATIONS I (3:3:0) Functions of two variables; the chain rule; vectors in space; double and triple integrals. Prerequisite: Math. 162.
250. DIFFERENTIAL EQUATIONS (3:3:0) Ordinary differential equations, applications, solutions by series. Students may take only one course for credit from Math. 250 and Math. 383. Prerequisite: Math. 240.
260. MATRICES AND STATISTICS (3:3:0) Systems of linear equations; matrix algebra; determinants; eigenvalues and eigenvectors; applications to differential equations; statistics. Prerequisite: Math. 162.
263. INTRODUCTION TO LINEAR ALGEBRA (3:3:0) Systems of linear equations, vector spaces, matrices, linear transformations, change of basis, determinants, characteristic roots and vectors. Prerequisite: Math. 162.
351. INTRODUCTION TO VECTOR ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS (3:3:0) Integral vector calculus, Fourier series, partial differential equations. Prerequisite: Math. 250. Students who have passed A.M. 451 may not schedule this course.
800. BUSINESS MATHEMATICS (3:3:0) Review of arithmetic, decimals, fractions, percentages, interest, and discounts; introduction to algebraic techniques; applications to business computations.
- 801-802. TECHNICAL MATHEMATICS (3:3:0 each) Elements of algebra and trigonometry for students in two-year technical programs. Prerequisites: 1 unit in algebra, 1 unit in plane geometry.
803. TECHNICAL CALCULUS (3:3:0) Selected introductory topics from analytic geometry, differential calculus, integral calculus. Prerequisites: Math. 801, 802.

## MECHANICAL ENGINEERING TECHNOLOGY (M E)

22. ENGINEERING THERMODYNAMICS (3:3:0) Basic thermodynamic concepts and definitions, first and second law of thermodynamics, properties of pure substances. Prerequisites: Chem. 12, Math. 240.
800. MECHANISMS (2:0:4) Motion in machine elements; strength and properties of materials; design of machine elements. Prerequisite: E.Mch. 811.
805. KINEMATICS (3:2:3) Graphical and analytical studies of relative motions, instant centers, velocity and acceleration in plane motions, slider crank mechanisms, cams, gears, gear trains, and flexible connectors. Prerequisites: E.G. 1, E.Mch. 811.
807. HEAT TRANSFER (3:3:0) Basic principles of conduction, convection, and radiation, emphasizing practical applications.

810. **PRODUCT DESIGN (3:1:6)** Design of machine elements including levers, bearings, shafts, clutches, springs, and gears; selection of ball bearings and belts; design of small mechanical devices. Prerequisites: E.Mch. 813, M.E. 805.

830. **SELECTED TOPICS IN MECHANICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in mechanical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

881. **ELEMENTARY THERMO AND FLUID DYNAMICS (2:2:0)** Basic problems in compressible fluid flow. Laws of dynamics and thermodynamics, mechanical properties of fluids, elementary heat transfer. Prerequisites: Math. 803, Phys. 150.

882. **AIR RESOURCE MANAGEMENT (2:2:0)** Introduction to air pollution. Pollutants, sources, effects, air monitoring systems, air quality criteria and standards, governmental control programs and procedures.

884. **SAMPLING AND MONITORING PROGRAM (2:0:4)** Instrumentation and site selection, field data acquisition for major air pollutants, data analysis and evaluation.

## **METALLURGICAL ENGINEERING TECHNOLOGY (MET E)**

800. **METALLURGICAL LABORATORY PRACTICE (4:2:4)** Instruction and practice in various metallurgical techniques. Prerequisite: Chem. 11. Prerequisite or concurrent: Phys. 150.

801. **PRINCIPLES OF EXTRACTIVE METALLURGY (2:2:0)** An introduction to several metals' extraction processes using a problem-solving approach. Prerequisite: Chem. 12.

802. **PHYSICAL METALLURGY (3:2:2)** Structures of metals and alloys; structure manipulations; structure-property relationships. Prerequisites: Chem. 12, Phys. 150, Math. 802, Met.E. 800.

803. **MATERIALS TESTING (3:1:4)** Applications of testing procedures to determine properties of inorganic materials.

804. **FERROUS METALLURGY (3:2:2)** Making, shaping, and heat treatment of cast irons and steels. Prerequisites: Chem. 12, Met.E. 800.

805. **NONFERROUS METALLURGY (3:2:2)** Extraction of nonferrous metals from their ores and subsequent compositional adjustment by refining and alloying. Prerequisites: Chem. 12, Met.E. 800.

806. **SUMMER FIELD PRACTICE (3)** Practical experience in the metallurgical industries.

807. **PLANT TRIPS (1:0:3)** Plant trips to metals industries; classroom discussion with metallurgists concerning their work, and the role of the metallurgical associate. Spring term, odd years.

## **METEOROLOGY (METEO)**

303. **INTRODUCTORY METEOROLOGY (3:2:2)** Nontechnical treatment of fundamentals of modern meteorology; effect of weather and climate on man and his activities. A student who took Meteo. 300 or 304 may take this course for 1 credit only.

## **MICROBIOLOGY (MICRB)**

1. **INTRODUCTORY MICROBIOLOGY (3:3:0)** Elementary principles of microbial and viral interrelationships, morphology, and physiology; relation to food, water, soil, industry, and disease processes. Prerequisite: Chem. 12.

2. **INTRODUCTORY MICROBIOLOGY LABORATORY (2:0:4)** Qualitative and quantitative techniques with regard to recognition of bacteria and their processes on a microscopic, colonial, and physiological basis. Prerequisite or concurrent: Micrb. 1. Prerequisite: Chem. 12.

6. **ELEMENTARY MICROBIOLOGY (2:2:0)** Importance of microorganisms in public health and disease, agriculture and industry; descriptive course for nontechnical students.

7. **ELEMENTARY MICROBIOLOGY LABORATORY (1:0:2)** Selected techniques with regard to recognition and enumeration of bacteria; effects of chemical and physical agents on microorganisms. Prerequisite or concurrent: Micrb. 6.

## MINERAL PROCESSING

101. MEDICAL MICROBIOLOGY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15) Procedures and techniques used to isolate and diagnose clinically significant organisms such as bacteria, fungi, and other human parasites. Prerequisites: Micrb. 1, 2.

102. HEMATOLOGY FOR MEDICAL LABORATORY TECHNICIANS (8:5:15) Theoretical and practical aspects of hematological diagnostic studies related to erythrocyte and leukocyte disorders in man.

801. CLINICAL LABORATORY ORIENTATION FOR MEDICAL LABORATORY TECHNICIANS (8:5:15) Introduction to basic principles of clinical laboratory work, including the collection, handling, and preparation of biological samples.

## MINERAL PROCESSING (MN PR)

61. INTRODUCTION TO COAL PREPARATION (3:3:0) Theory and application of modern coal preparation practice. Sampling, crushing, sizing, gravity concentration, flotation, dewatering, drying; pollution control; flowsheets.

## MINING (MNG)

23. MINERAL LAND AND MINE SURVEYING (3:0:9) Surveying theory and practice applied to mineral lands and mines; traversing, leveling, mapping, shaft plumbing; stope, room, and development surveying. Prerequisites: E.G. 11,  $\frac{1}{2}$  unit of secondary school trigonometry.

30. INTRODUCTION TO MINING ENGINEERING (3:2:3) Examination, development, and exploitation of mineral deposits in case studies of mineral deposits and mines; unit operations, cycling, equipment, methods.

## MINING TECHNOLOGY (MNG T)

800. MINING TECHNOLOGY ORIENTATION (1:0:2) Films, slides, and lectures to acquaint the student with the coal mining industry and its impact on society.

801. COAL MINING TECHNOLOGY (3:2:3) Analysis of coal mining systems; integration of unit operations and mining methods for efficient mine production.

802. MINE VENTILATION (3:2:3) Quality and quantity analysis and control of mine atmosphere. Prerequisites or concurrent: Chem. 11, Phys. 150, Mng.T. 801.

803. STRATA CONTROL (3:2:3) Fundamentals of stresses and strains in rocks; virgin and concentrated stresses; roof support, subsidence, bursts, and stability control. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Mng.T. 801.

804. MINE PLANT TECHNOLOGY (3:2:3) Electrical systems in mines; mechanical power applications and materials handling systems. Prerequisite: Phys. 150.

805. MINE SYSTEMS TECHNOLOGY (3:2:3) Quantitative methods of work measurement and their application to production and method study problems related to mines. Prerequisite: Mng.T. 801.

806. MINE MANAGEMENT AND LAW (3:3:0) The problems of the individual in coal mine management in relation to environment, employer, union, and law.

807. ELECTRICAL MINE MACHINE CIRCUITS (3:2:3) Topics of electrical power fundamentals, power and control circuits, motors and their mine applications will be covered. Prerequisite: Mng.T. 804.

808. MINE POWER DISTRIBUTION (3:2:3) Topics of high voltage circuits, underground transmission, power stations, power conversion, safety regulations, and power devices will be covered. Prerequisite: Mng.T. 804.

809. MINE MACHINERY HYDRAULICS (3:2:3) Topics of basic hydraulic principles and their application to mining and mine machinery will be covered. Prerequisites: Math. 802, Phys. 150.

810. MINE MACHINE DYNAMICS (3:2:3) Topics on basic machines and their application to the principles of mine machine operation will be covered. Prerequisites: E.Mch. 811, Phys. 150.



811. PRACTICUM IN MINE MAINTENANCE (3:0:9) Field and shop techniques in procedures of electrical, mechanical, and hydraulic phases of mine maintenance will be covered. Prerequisites: Mng.T. 804, Phys. 150.
815. SURFACE MINING TECHNOLOGY (3:2:3) Analysis of surface mining systems; integration of unit operations and equipment utilization for efficient operation. Prerequisite: Mng.T. 800.
816. ELEMENTS OF SURFACE MINE DESIGN (3:2:3) Exploration methods, pit planning, and design; drilling and fragmentation; loading and haulage systems; and slope stability. Prerequisite: Mng.T. 815.
817. SURFACE MINING PRODUCTION TECHNOLOGY (3:2:3) Application of time study and work measurement to surface production. Efficiency of equipment usage and equipment utilization scheduling. Prerequisite: Mng.T. 815.
818. SURFACE MINING HYDROLOGY (3:3:0) Water control and treatment; hydrologic studies before and after mining; impoundments and water treatment. Prerequisites: Chem. 11; Geosc. 1 or 20 or 101.
819. RECLAMATION TECHNOLOGY (3:3:0) Spoil-bank reclamation and contour grading; re-vegetation and reclaimed land utilization.

## MUSIC (MUSIC)

5. THE FUNDAMENTALS OF MUSIC APPRECIATION (3:3:0) Recitation and lectures with recorded examples of melody, harmony, rhythm, vocal and instrumental timbre, form, and program and absolute music.

## MUSIC EDUCATION (MU ED)

806. MUSIC SKILLS FOR RECREATION LEADERS (3:3:0) Theories and practice in music activities found in group and club settings. Appreciation, leadership techniques, and fundamental musicology.

## NUCLEAR ENGINEERING TECHNOLOGY (NUC E)

800. NUCLEAR AND ATOMIC SCIENCE (2:2:0) Introduction to the theories of atomic and nuclear structure and electromagnetic radiation. Prerequisites: Phys. 151, Math. 803.
801. RADIOLOGIC SAFETY (2:2:0) Discussion of basic radiation dose units, radiation monitoring techniques, biological effects of radiation, and AEC regulations. Prerequisite or concurrent: Nuc.E. 800.
802. ELEMENTS OF NUCLEAR TECHNOLOGY (2:2:0) Study of nuclear radiations, nuclear interactions, neutron diffusion, and reactor materials. Prerequisite: Nuc.E. 800.
803. ELEMENTS OF NUCLEAR POWER GENERATION (3:3:0) Survey of various reaction types with emphasis on fuel heat removal and power generation, shielding, fuel fabrication and reprocessing. Prerequisite: Nuc.E. 802.
804. INTRODUCTION TO REACTOR TECHNOLOGY (3:3:0) Steady state reactor theory, kinetic behavior of reactors and reactor control systems. Prerequisite: Nuc.E. 802.
805. PRINCIPLES OF MEASUREMENT (3:2:2) A study of measurement in the nuclear industry, including the instruments used, accuracy of measurement, and statistical justification. Prerequisites: E.E. 814, Phys. 151.
812. NUCLEAR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of radiation measurements and the diversified application of nuclear techniques. Prerequisites: Nuc.E. 801, 802.
814. REACTOR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of basic reactor experiments, control rod calibration, critical experiment, etc. Emphasis placed upon reactor operations. Must be taken with Nuc.E. 804. Prerequisite: Nuc.E. 801.
830. SELECTED TOPICS IN NUCLEAR ENGINEERING TECHNOLOGY (3) Individual or group work in nuclear engineering technology for students with specific occupational objectives. Prerequisite: fourth-term standing.



## NUTRITION (NUTR)

150. ELEMENTARY NUTRITION (2:2:0) Fundamentals of nutrition and its relation to human health. Students who have passed Nutr. 351 may not schedule this course.

351. INTRODUCTORY PRINCIPLES OF NUTRITION (3:3:0) The nutrients: food sources and physiological functions as related to human growth and well-being throughout life; current nutrition issues. Students who have passed Nutr. 150 may not schedule this course.

800. NORMAL DIET MODIFICATIONS (4:3:3) Modifications of normal diet to meet therapeutic needs in patient care and rehabilitation.

801. NUTRITION COMPONENT OF THE FOOD SERVICE SYSTEM (3:3:0) Introduction to basic nutrition principles and their application in a food service system.

## PHILOSOPHY (PHIL)

1. CRITICAL THINKING AND ARGUMENT (3:3:0) Principles of correct thinking; deductive and inductive inference; use and misuse of language in reasoning.

2. INTRODUCTION TO EXISTENTIAL PHILOSOPHY (3:3:0) Evaluation of the intellectual and moral tone of the present day through a study of existentialism and other recent philosophies. Prerequisite: fourth-term standing.

3. ETHICS AND SOCIAL ISSUES (3:3:0) Ethical issues such as war, privacy, crime and punishment, racism and sexism, civil liberties, affirmative action, abortion, and euthanasia.

4. BASIC PROBLEMS OF PHILOSOPHY (3:3:0) How important philosophers have treated the perennial problems of knowledge, reality, free will, etc.

12. ELEMENTS OF SYMBOLIC LOGIC (3:3:0) How to translate arguments into symbolic language and test them for validity using truth-tables and deduction rules. For nonscience majors.

103. MAN AND MORAL VALUE (3:3:0) Freedom, choice, and obligation in conduct; values in a scientific age; the pursuit of happiness and other goals of life. Prerequisite: fourth-term standing.

104. ETHICS AND THE PROFESSIONS (3:3:0) The philosophical basis for the ethics of professional practice; illustrations include law, business, public administration, journalism, engineering, teaching, medicine.

105. INTRODUCTION TO THE PHILOSOPHY OF LAW (3:3:0) Topics normally include concepts of law and responsibility, justice and punishment, legal ethics, and the limits of law.

106. BUSINESS ETHICS (3:3:0) A study of ethical issues which confront the business community. Designed primarily for majors in the College of Business Administration.

108. SOCIAL AND POLITICAL PHILOSOPHY (3:3:0) Philosophical analysis of political and communal order; ideal standards of individual and group action within practical structure of social obligation. Prerequisite: fourth-term standing.

111. ORIENTAL PHILOSOPHY (3:3:0) Outstanding contributions to philosophic and religious thought in the Near East, India, and China. Prerequisite: fourth-term standing.

212. SYMBOLIC LOGIC (3:3:0) The logic of classes, propositions, relations, and quantification; the nature and properties of formal systems. Intended primarily for science-oriented students. Prerequisite: fourth-term standing.

## PHYSICAL EDUCATION (PH ED)

\*5. PHYSICAL EDUCATION (1:0:3 per term) Activities to develop physical and recreational skills; beginning swimming required of those who fail swim-safety test. Selection from archery, badminton, bowling, canoeing, cross-country skiing, dancing, fencing, figure skating, golf, handball, hunter safety, orienteering, racquetball, riflery, sailing, scuba, squash, survival training, swimming, tennis, volleyball, weight training, and others. Typically, two activities per term.

9. LIFE SAVING AND WATER SAFETY (1:0:3) Course outlined by the American Red Cross; prepares the student for the Senior Life Saving examination. Prerequisite: passing of qualifying swimming test.

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\*Must be repeated for a total of 3 credits to satisfy University Baccalaureate Degree Requirements.

807. ADAPTED ACTIVITIES (1:0:3) Adaptation of activities and methods of presentation of games for the handicapped.

## PHYSICAL SCIENCE (PH SC)

7. PHYSICAL SCIENCE (3:3:0) Development of physics, including modern physical concepts and their relationship to the careers of physical scientists. May not be scheduled by students who have received credit for Phys. 201 or 215.

8. PHYSICAL SCIENCE (3:3:0) Selected concepts of chemistry showing their development, interrelationship, and present status. May not be scheduled by students who have received credit for Chem. 11 or 12.

## PHYSICIAN'S ASSISTANT (P A)

800. MECHANISMS OF BODY FUNCTIONS I (2:1:2) Introduction of principles of anatomy, physiology, and biochemistry relating to structure and function of cells and tissues.

801. MECHANISMS OF BODY FUNCTIONS II (2:1:2) Continuation of P.A. 800. An integration of biological principles relating to structure and function of selected organ systems. Prerequisite: P.A. 800.

802. MECHANISMS OF BODY FUNCTIONS III (2:1:2) Continuation of P.A. 801. An investigation of biological principles relating to structure and function of selected organ systems. Prerequisite: P.A. 801.

805. MICROBIOLOGY (2:2:0) Study of common fungi, bacteria, and viruses with regard to colonization, growth, nutrition, and cultivation, as they relate to common diseases.

807. HUMAN GENETICS (1:1:0) Basic principles of classical genetics as they relate to problems presented in a primary care setting.

810. HUMAN BEHAVIOR: PRINCIPLES AND HEALTH PROBLEMS I (2:2:0) Introduction to the principles of behavioral science for understanding behavior and behavior modification necessary for health maintenance.

811. HUMAN BEHAVIOR: PRINCIPLES AND HEALTH PROBLEMS II (2:1:2) Continuation of P.A. 810. Principles of behavioral science for understanding behavior and behavior modification necessary for health maintenance. Prerequisite: P.A. 810.

820. PATIENT-ORIENTED CARE I—RELATING TO THE PATIENT (1:0:2) Development of the comprehensive approach to patient care. An introduction to interpersonal skills, interviewing, and data gathering.

821. PATIENT-ORIENTED CARE II—PROBLEM ANALYSIS (2:2:0) Continuation of P.A. 820. An introduction to health care systems, the natural history of disease, data recording, data synthesis. Prerequisite: P.A. 820.

822. PATIENT-ORIENTED CARE III—THE PATIENT, THE PRACTICE, AND THE COMMUNITY (2:2:0) Continuation of P.A. 821. An introduction to disease patterns, epidemiologic terminology, individual and environmental problems, and resources in the community context. Prerequisite: P.A. 821.

830. MEDICAL-SURGICAL PROBLEMS I (2:1:2) Introduction to the principles of assessment and management of selected medical-surgical problems in a primary care setting.

831. MEDICAL-SURGICAL PROBLEMS II (2:1:2) Continuation of P.A. 830. Introduction to the principles of assessment and management of selected medical-surgical problems. Prerequisite: P.A. 830.

832. MEDICAL-SURGICAL PROBLEMS III (2:1:2) Continuation of P.A. 831. Introduction to the principles of assessment and management of selected medical-surgical problems. Prerequisite: P.A. 831.

840. DIAGNOSTICS (1:0:2) An introduction to basic laboratory, radiological, and electrocardiograph studies used in a primary care setting.

850. THERAPEUTICS (2:1:2) An introduction to basic applied clinical therapeutics, with emphasis on significant modalities used in the primary care setting.

## PHYSICS

860. EMERGENCY MEDICINE (2:2:0) Introduction to the initial evaluation and management of common problems seen in an emergency room setting. Prerequisite: P.A. 820.
870. PEDIATRICS (2:2:0) An introduction to the basic principles used in caring for normal children and children with specific problems. Prerequisite: P.A. 820.
880. PRACTICUM IN PRIMARY HEALTH CARE DELIVERY I (10) Emphasis on health maintenance, periodic appraisal of adults, evaluation of common medical-surgical problems, and implementation of therapeutic modalities.
881. PRACTICUM IN PRIMARY HEALTH CARE DELIVERY II (10) Emphasis on health maintenance, periodic appraisal of children, evaluation of common medical-surgical problems, and implementation of therapeutic modalities.
882. PRACTICUM IN PRIMARY HEALTH CARE DELIVERY III (10) Emphasis on health maintenance, periodic appraisal of adults, evaluation of common medical-surgical and behavioral problems, and implementation of therapeutic modalities.

## PHYSICS (PHYS)

150. TECHNICAL PHYSICS (3:2:2) Elementary treatment of topics in mechanics, heat, wave motion, and sound leading toward an understanding of technical applications. Prerequisite: 1½ units of algebra. Prerequisite or concurrent: Math. 801.
151. TECHNICAL PHYSICS (3:2:2) Elementary treatment of topics in electricity, light, and modern physics leading toward an understanding of technical applications. Prerequisite: Phys. 150.
201. GENERAL PHYSICS (4:4:0) Mechanics, wave motion, and sound. Prerequisite: Math. 162.
202. GENERAL PHYSICS (4:3:2) Electricity and magnetism. Prerequisite: Phys. 201.
203. GENERAL PHYSICS (3:3:0) Heat, optics, and modern physics. Prerequisite: Phys. 202.
204. GENERAL PHYSICS (4:3:2) Heat, optics, and modern physics with laboratory. Prerequisite: Phys. 202.
215. INTRODUCTORY PHYSICS (4:3:2) Selected topics in mechanics, heat, and sound. Prerequisite: algebra to quadratics.
237. INTRODUCTION TO ATOMIC AND NUCLEAR PHYSICS (3:3:0) Atomic and molecular theory, relativity, elementary particles, nuclear structure and reactions. Prerequisites: Phys. 203, 204.
265. INTRODUCTORY PHYSICS (4:3:2) Selected topics in light, electricity, and magnetism. Prerequisite or concurrent: Phys. 215.
297. SPECIAL TOPICS (1-6)

## POLITICAL SCIENCE (PL SC)

1. AMERICAN NATIONAL GOVERNMENT (3:3:0) Development and nature of American political culture; constitutional and structural arrangements; policy-making processes; sources of conflict and consensus.
2. AMERICAN PUBLIC POLICY (3:3:0) Examination of selected areas of public policy in America. Analysis of policy content, alternatives and impact. Prerequisite: Pl.Sc. 1.
3. GOVERNMENT AND POLITICS IN MODERN SOCIETY (3:3:0) Introduction to study of government and politics. Normative and empirical theories; governmental functions in modern communities; representative structures and processes.
14. INTERNATIONAL RELATIONS (3:3:0) Characteristics of modern nation-states and forces governing their international relations; nationalism; imperialism; diplomacy; current problems of war and peace. Credit will not be given for both this course and Int.U. 200.
20. COMPARATIVE POLITICS—WESTERN EUROPE (3:3:0) Comparative analysis of political cultures, interest groups, parties, and decision-making processes in principal Western European political systems.



## PSYCHOLOGY (PSY)

2. **PSYCHOLOGY (3:3:0)** Introduction to general psychology; principles of human behavior and their applications.
13. **INTRODUCTION TO DEVELOPMENTAL PSYCHOLOGY (3:3:0)** Developmental principles; physical growth; linguistic, intellectual, emotional, and social development from infancy to maturity. Prerequisite: Psy. 2.
37. **MENTAL HEALTH (3:3:0)** Maintaining adjustment, developing a well-balanced personality; behavior disorders and their treatment. May not be used as prerequisite for any course in psychology. Not open to psychology majors or those who have credit for Psy. 437.
102. **RESEARCH METHODS IN PSYCHOLOGY (4:1:6)** Designed to develop skills in nonlaboratory research techniques, particularly methods used in field studies and sample survey research. Prerequisites: Psy. 2, Stat. 200.

## QUANTITATIVE BUSINESS ANALYSIS (Q B A)

101. **INTRODUCTION TO QUANTITATIVE BUSINESS ANALYSIS (3:3:0)** Introduction to quantitative methods for conceptualizing business and management problems. Prerequisite: Math. 18 or 120.
102. **ELEMENTARY BUSINESS STATISTICS (3:3:0)** Statistical inference; estimation, hypothesis testing, testing, correlation, and regression; application of statistical techniques to economic and business problems. Prerequisite: Q.B.A. 101.
801. **ELEMENTARY BUSINESS STATISTICS (3:3:0)** Collection, tabulation, measurement, presentation, and interpretation of quantitative material. Prerequisite: fourth-term standing.

## RADIOLOGIC TECHNOLOGIST RADIOGRAPHER (R T R)

1. **HISTORY OF RADIOLOGY; ELEMENTARY RADIATION PROTECTION; MEDICAL ETHICS (1:2:6)** History of radiology field, basic principles of radiation protection, applications of medical ethics, base office procedures, departmental structure.
20. **MEDICAL TERMINOLOGY; RADIOGRAPHIC POSITIONING I (1:3:5)** Introduction to the medical profession's language; basic positional terminology, emphasis on skeletal positioning with skull introduction.
30. **RADIOGRAPHIC EXPOSURE I; FILM CRITIQUE I (1:3:5)** Preliminary exposure factors concerning radiographic imaging; evaluation of radiographic films.
40. **RADIOGRAPHIC POSITIONING II: CONTRAST PROCEDURES; NURSING PROCEDURES (5:3:13)** Body system positionings, radiologic applications on contrast media, nursing procedures pertinent to radiologic technology. Prerequisite: R.T.R. 20.
50. **RADIOGRAPHIC EXPOSURE II (1:2:5)** Emphasis on problem solving and formation of technique chart. Prerequisite: R.T.R. 30.
60. **DARKROOM CHEMISTRY; FILM CRITIQUE II (1:3:5)** Film composition, manifestation of latent image and film processing techniques; continuation evaluation of radiographic films. Prerequisites: Chem. 11, R.T.R. 30.
70. **RADIOGRAPHIC POSITIONING III (1:2:6)** Review of skeletal, skull, and body systems; emphasis on pediatric, geriatric, psychiatric, and intra-oral radiography. Prerequisite: R.T.R. 40.
80. **SPECIAL PROCEDURES; REGISTRY REVIEW (1:5:14)** Invasive contrast procedures pertinent to radiology. Tomography, paradiologic imaging modalities; review for registry examination. Prerequisite: R.T.R. 70.
90. **MEDICAL AND SURGICAL DISEASES; REGISTRY REVIEW II (1:3:14)** Review of registry examination, definition of various diseases, and pathology pertaining to bodily systems. Prerequisites: Biol. 41, R.T.R. 80.



## READING, COMMUNICATION, AND LANGUAGE EDUCATION (RCLED)

5(A,B). COLLEGE READING SKILLS IMPROVEMENT (2-4) Improving reading comprehension, vocabulary, rate, study skills, and integrating these more efficiently in course work.

*Unit A:* Average or better readers seeking advanced work or preparation for specific goals.

*Unit B:* Limited to students needing developmental reading instruction and recommended on the basis of reading entrance test scores.

## REAL ESTATE (R EST)

100. REAL ESTATE (3:3:0) Nature of urban real estate and market forces affecting it; real estate finance, sales, and brokerage. Prerequisite: fifth-term standing.

800. REAL ESTATE PRINCIPLES (3:3:0) Nature of the real estate market; introduction to the functions performed in the real estate business.

810. REAL ESTATE SALES (3:3:0) Principles underlying the sale of real estate; the use of selling tools and procedures in the analysis of customers' needs.

830. REAL ESTATE FINANCE (3:3:0) Basic principles of real estate finance; sources of funds for financing real estate.

## RECREATION AND PARKS (RC PK)

120. LEISURE AND HUMAN EXPERIENCE (3:3:0) Introduction to leisure in historical and contemporary perspective. Relationships between leisure and other social institutions. Determinants of leisure behavior.

130. OUTDOOR LIVING SKILLS (1:0:3) Direct experience with outdoor living skills and backpacking; weekend campout. American Camping Association's Advanced Campcraft certification skills covered. Prerequisite: American Red Cross Standard First Aid and Personal Care certificate recommended.

190. PERSPECTIVES FOR THE RECREATION AND PARKS PROFESSIONAL (3:2:2) Historical view of recreation and parks movement in the U.S.; observation and analysis services; investigation of professional preparation.

230. CAMP COUNSELING (2:1:2) Counselor skills and responsibilities for the organized camp.

236. THEORY AND PRACTICE OF RECREATION LEADERSHIP (3:2:2) Methods and materials; experience in recreation leadership with different age groups and in a variety of school and community settings.

256. RECREATION PROGRAM ORGANIZATION (3:3:0) Principles, policies, and procedures in the organization and direction of recreation programs; in-service training programs. Prerequisite: Rc.Pk. 236.

275. INTRODUCTION TO THERAPEUTIC RECREATION (3:3:0) Survey of disabilities and needs of the handicapped and their implications for recreation leadership and programming. Prerequisites: 6 credits of psychology and/or sociology; Rc.Pk. 236.

295. THE SCOPE OF RECREATION AND PARKS SERVICES (1) Observation of and exposure to components, programs, and agencies which make up the field of recreation and parks services.

377. PRINCIPLES AND CONCEPTS OF THERAPEUTIC RECREATION (3:2:2) Basic principles and concepts of therapeutic recreation relating both to institutional and to community-based leisure-delivery systems. Prerequisites: Rc.Pk. 256; Rc.Pk. 275 or E.E.C. 400.

850. FIELD PRACTICUM (3) Observation and participation in a recreation system, hospital, youth-serving agency, or other setting.

## RELIGIOUS STUDIES (RL ST)

1. INTRODUCTION TO THE STUDY OF RELIGION (3:3:0) Origin and function of religion in the individual and culture; outstanding personalities, sacred books, interaction of religion with culture.
19. RELIGION IN AMERICAN LIFE AND THOUGHT (3:3:0) The function, contributions, tensions, and perspectives of religion in American culture.
141. (C.Lit. 141) RELIGION AND THE CREATIVE IMAGINATION (3:3:0) An examination of the arts as expression of man's religious dimension, focusing on the study of contemporary literature.

## RETAILING (RTL)

840. MANAGEMENT IN THE HOME (3:3:0) The principles of decision making, work simplification, use of equipment, and home safety applied to family management.
850. DISPLAY TECHNIQUES (2:1:3) Display as visual communication, emphasizing the techniques related to merchandising and art. Prerequisite: an art or art appreciation course.

## SCIENCE, TECHNOLOGY, AND SOCIETY (S T S)

100. THE ASCENT OF MAN (3:3:0) A survey of some of the intellectual achievements which highlight mankind's attempts to understand nature and shape the environment.

## SOCIAL SCIENCE (SO SC)

1. THE URBANIZATION OF MAN: A SOCIAL SCIENCE PERSPECTIVE (3:3:0) An overview of the social sciences, including an interdisciplinary analysis of the urban process.
2. CONTEMPORARY MAN AND SOCIETY (3:3:0) Selected contemporary issues in the perspective of history, sociology, psychology, economics, and political science.
110. INTRODUCTION TO CONTEMPORARY AFRICA (3:3:0) Consideration of influences and forces at work; leaders, elites, and groups. Analysis of problems and issues in Africa.

## SOCIOLOGY (SOC)

1. INTRODUCTORY SOCIOLOGY (3:3:0) Social structure; basic human institutions; analysis of social processes; major social forces.
3. INTRODUCTORY SOCIAL PSYCHOLOGY (3:3:0) Culture, conduct, and the sociogenesis of behavior.
5. SOCIAL PROBLEMS (3:3:0) Poverty, delinquency, crime; family discord; industrial, race, and nationality conflicts; mental disorders.
7. METHODOLOGY OF SOCIOLOGY (3:3:0) Introduction to the nature, collection, and interpretation of materials used by social scientists in research and publication. Prerequisite: 3 credits in sociology.
15. URBAN SOCIOLOGY (3:3:0) Growth of metropolitan communities; differentiation of functions; urban complexity; ecological areas; the city as a way of life. Prerequisite: 3 credits in sociology.
19. INTERGROUP RELATIONS (3:3:0) Cultural groupings in American society; assimilation problems; modern antidiscrimination policies.
30. SOCIOLOGY OF THE FAMILY (3:3:0) Family structure and interaction; functions of the family as an institution: cross-cultural comparisons. Prerequisite: 3 credits in sociology.

## SOLAR TECHNOLOGY (S T)

801. **INTRODUCTION TO SOLAR TECHNOLOGY (2:1:2)** Introduction to solar technology from the standpoint of history, ecology, and energy.
804. **ANALYSIS OF SOLAR HEATING AND COOLING SYSTEMS (3:1:5)** Comprehensive analysis and application of solar heating and cooling systems. Calculations and layout. Prerequisites: A.E. 809, S.T. 802, 803.
806. **PASSIVE SYSTEMS AND CONSERVATION METHODS (3:3:0)** Passive concepts and designs; earth sheltering; energy audits and conservation techniques; wood burning equipment.
807. **LIQUID SPACE HEATING AND DOMESTIC HOT WATER SYSTEMS (3:2:2)** Liquid collectors, storage, and domestic hot water systems; pumps and piping; heat exchangers; fluid and component selection; power and controls. Prerequisites: S.T. 801, M.E. 881, A.E. 803.
808. **AIR SYSTEMS AND CONVENTIONAL HEATING EQUIPMENT (3:2:2)** Air collector and storage systems; fans and ductwork; heat exchange coils; controls; conventional-fired equipment operation. Concurrent: S.T. 807.
809. **NONTECHNICAL ASPECTS OF SOLAR TECHNOLOGY (3:2:2)** System sizing with f-chart method; economic analysis techniques; cost estimating; job scheduling; legal aspects; warranties; solar cooling methods and economics. Prerequisite: S.T. 801.
830. **SELECTED TOPICS IN SOLAR HEATING AND COOLING TECHNOLOGY (3)** Individual or group work in solar heating and cooling technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: fourth-term standing.

## SPANISH (SPAN)

1. **ELEMENTARY SPANISH (4:3:2)** Audio-lingual approach to basic Spanish; writing.
2. **ELEMENTARY SPANISH (4:3:2)** Audio-lingual approach to basic Spanish continued; writing. Prerequisite: Span. 1.
3. **INTERMEDIATE SPANISH (4:3:2)** Audio-lingual review of structure; writing; reading. Prerequisite: Span. 2.
131. **IBERO-AMERICAN CIVILIZATION (3:3:0)** Spanish American and Brazilian life from the Conquest to the present: literature, art, the indigenous heritage, and contemporary problems.

## SPEECH COMMUNICATION (SPCOM)

200. **EFFECTIVE SPEECH (3:3:0)** Introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.
- Unit A.* Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation.
- Unit B.* Principles of communication, implemented through group problem solving, with some attention to formal speaking and message evaluation.
- Unit C.* Principles of communication, implemented through analysis and evaluation of messages, with some attention to formal speaking and group discussion.
240. **BROADCAST ANNOUNCING (3:2:2)** The study of speech communication principles applied to radio and television announcing, including ethical principles. Prerequisites: Sp.Com. 200 and 3 additional credits in speech communication, preferably Sp.Com. 205 or 280.
245. **RADIO AND TELEVISION STUDIO OPERATIONS (3:2:2)** Introduction to studio procedures and techniques; emphasis on use of broadcast equipment, lectures, and studio experience.
280. **ORAL INTERPRETATION (3:3:0)** Principles of oral interpretation of the printed page with practice in oral reading of poetry, prose, and drama.
295. **STUDIO PRACTICUM (1-3)** Supervised experience in the arts and crafts of radio and television production. Prerequisite: Sp.Com. 325 or 340.
296. **INDEPENDENT STUDIES (1-12)**
335. **TELEVISION AND RADIO WRITING (3:2:2)** Analysis and writing of principal types of television and radio material. Production and criticism of student scripts.



340. **RADIO BROADCASTING (3:2:2)** Introduction to radio: history, organizational structure, responsibilities; development and production of radio programs. Prerequisite: Sp.Com. 245.
345. **TELEVISION BROADCASTING (3:2:2)** Introduction to television: history, organizational structure, responsibilities; development and production of television programs. Prerequisite: Sp.Com. 340.

## STATISTICS (STAT)

200. **ELEMENTARY STATISTICS (4:3:2)** Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. Prerequisite: 2 units in algebra.
318. **ELEMENTARY DISCRETE PROBABILITY (3:3:0)** Discrete probability spaces; random variables; expectations; independence and dependence; introduction to Markov chains and other stochastic processes. Prerequisite: Math. 17 or 120 or 161.

## TELECOMMUNICATIONS (TELCM)

840. **INTRODUCTION TO TELECOMMUNICATIONS SYSTEMS (2:2:0)** Elements of telecommunications systems including telephones, transmission lines, switching, digital data, and transmission by microwave, satellite, and fiber optics.
841. **SWITCHING AND TRAFFIC (3:3:0)** Routing of telecommunications messages: characteristics, methods, and control. Prerequisite: TelCm. 840.
842. **ELEMENTARY TELECOMMUNICATIONS LABORATORY (1:0:2)** Basic measuring equipment for telecommunications systems. Prerequisite: TelCm. 840. Prerequisite or concurrent: TelCm. 841.
843. **TRANSMISSION (3:3:0)** Transmission of telecommunications information, including design problems. Prerequisites: TelCm. 841, 842.
844. **ADVANCED TELECOMMUNICATIONS LABORATORY (1:0:2)** Installation, alignment, and operation of advanced telecommunication equipment. Prerequisite or concurrent: TelCm. 843.

## THEATRE ARTS (THEA)

100. **THE ART OF THE THEATRE (3:3:0)** Survey of the history, craft, and art of the theatre to support an informed appreciation of theatrical events.
104. **PROCESSES OF THEATRE PRODUCTION (3:1:4)** General training and experience in technical theatre for the nonprofessionally oriented production student.
109. **THE DRAMATIC ARTS IN THE MASS MEDIA (3:3:0)** The place of television-radio-film drama in our culture; relationship with other art forms; standards of evaluation.
210. **INTRODUCTION TO CREATIVE DRAMATICS (3:1:4)** Introduction and direct experience in creative dramatics and survey of children's theatre.
296. **INDEPENDENT STUDIES (1-12)**

## WILDLIFE (WILDL)

801. **INTRODUCTION TO WILDLIFE MANAGEMENT (3:3:0)** Basic principles of wildlife management. Introduction to general ecology and wildlife population dynamics.
803. **ANIMAL IDENTIFICATION (3:2:3)** Identification of mammals, birds, reptiles, amphibians, and fishes; introduction to their life histories.
804. **WILDLIFE MENSURATION (3:2:3)** The measurement of animal populations and vegetation samples.
805. **FIELD AND LABORATORY TECHNIQUES (3:1:6)** Techniques utilized in wildlife research and management; introduction to mapping, photography, census, record keeping, and measurement of population structure. Prerequisites: For. 802, Wildl. 801, 803, 804, 812, 814. Concurrent: Wildl. 806.



## WILDLIFE

806. OPERATIONAL PROCEDURES AND EQUIPMENT (2:1:3) Summer camp for operational procedures and the operation and maintenance of wildlife equipment and facilities. Concurrent: Wildl. 805.
807. OUTDOOR RECREATION (3:2:3) Sociology, history, and economics of recreational demand; recreational areas and management procedures.
809. ANIMAL CARE (3:2:3) Care and handling of captive wild animals.
811. AERIAL PHOTO INTERPRETATION (4:2:6) Techniques of photo interpretation; type mapping of wildlife environments; photo censusing of wild animals.
812. WILDLIFE FIELD SURVEYS (3:2:3) Terrestrial measurement, methods of plotting, area determinations, cover, and type mapping.
813. FISHERIES MANAGEMENT FOR TECHNICIANS (3:2:3) Introduction to fisheries management, biology of fishes, aquatic ecology, use and care of equipment, habitat surveys, and management practices.
814. HABITAT MANAGEMENT (3:0:9) Identification, ecological characteristics, manipulation of food and cover plants. Animal needs, range and habitat analysis, and management for wildlife.

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# Bulletin

1983-1984

The Pennsylvania State University

**Associate  
Degree  
Programs**





# Bulletin

1983-1984

The Pennsylvania State University

## Associate Degree Programs

DEC 22 1982

## STATEMENT OF NONDISCRIMINATION

The Pennsylvania State University, in compliance with applicable federal and state equal opportunity laws and regulations governing affirmative action and nondiscrimination, does not discriminate in the recruitment, admission, and employment of students, faculty, and staff in the operation of any of its educational programs and activities as defined by law. Accordingly, nothing in this publication should be viewed as directly or indirectly expressing any limitation, specification, or discrimination as to race, religion, color, or national origin; or to handicap, age, sex, or status as a disabled or Vietnam-era veteran, except as provided by law. Any inquiries concerning this policy may be directed to the vice president for student affairs.

## REGULATIONS SUBJECT TO CHANGE

The educational process necessitates change. The information in this bulletin was prepared in the fall of 1982. It was as complete and accurate as possible at that time. However, the nature of the change to a new academic calendar is an iterative process. Some additional changes can be anticipated in course offerings and programs or in other aspects described in this bulletin. This bulletin must be considered as informational and not binding on the University.

Each step of the educational process, from admission through graduation, requires continuing review and appropriate approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

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# UNIVERSITY CALENDAR\*

## SPRING TERM 1983

### MARCH

- 6 Sunday—Arrival date
- 7 Monday—Orientation and advising
- 7,8 Monday, Tuesday—Registration
- 9 Wednesday—Classes begin 8:00 a.m.

### MAY

- 17 Tuesday—Classes end 9:55 p.m.
- 18-21 Wednesday to Saturday—Final examinations
- 28 Saturday—Commencement

## SUMMER TERM 1983

### JUNE

- 12 Sunday—Arrival date
- 13 Monday—Orientation and advising
- 14 Tuesday—Registration
- 15 Wednesday—Classes begin 8:00 a.m.

### JULY

- 4 Monday—Independence Day holiday, no classes#

### AUGUST

- 10 Wednesday—Classes end 9:55 p.m.
- 11-13 Thursday to Saturday—Final examinations
- 20 Saturday—Commencement

## FALL SEMESTER 1983

### AUGUST

- 21 Sunday—Arrival date
- 22-25 Monday to Thursday—Orientation and registration
- 26 Friday—Classes begin 8:00 a.m.

### SEPTEMBER

- 5 Monday—Labor Day holiday, no classes

### NOVEMBER

- 24-27 Thursday to Sunday—Thanksgiving holiday, no classes

### DECEMBER

- 13 Tuesday—Classes end 9:30 p.m.
- 14-15 Wednesday, Thursday—Study days
- 16-17 Friday, Saturday—Final examinations
- 19-22 Monday to Thursday—Final examinations

## SPRING SEMESTER 1984

### JANUARY

- 10 Tuesday—Arrival date
- 11-13 Wednesday to Friday—Orientation and registration
- 16 Monday—Classes begin 8:00 a.m.

### MARCH

- 5-9 Monday to Friday—Spring holiday

### MAY

- 4 Friday—Classes end 9:30 p.m.
- 5-6 Saturday, Sunday—Study days
- 7-12 Monday to Saturday—Final examinations
- 19 Saturday—Spring commencement

\*This calendar is subject to change without notice. Although the University makes every effort to avoid conflicts with religious holidays in preparing the calendar for an academic year, such conflicts are sometimes unavoidable. When they occur, efforts are made to make special arrangements for the students affected.

#Classes that would have met on Monday, July 4, 1983, will meet on Wednesday, August 10, 1983.



# UNIVERSITY ADMINISTRATION

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BRYCE JORDAN, B.Mus., M.Mus., Ph.D. *President-elect*

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### COLLEGE OF HUMAN DEVELOPMENT

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### COLLEGE OF THE LIBERAL ARTS

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 JOHN C. MARSHALL, B.S., M.Ed. *Assistant Director for Continuing Education*  
 DAVID R. STEWART, B.S., M.Ed., D.Ed. *Dean of Student Affairs*  
 TERRY K. ENGBAHL, B.A., M.S. *Assistant Director for University Relations*  
 VONI B. GRIMES *Business Manager*

**PENN STATE CAMPUSES**

**\*UNIVERSITY PARK CAMPUS**

University Park, PA 16802  
 Area Code 814 865-4700

**ALLENTOWN CAMPUS**

Academic Building, Fogelsville, PA 18051  
 Area Code 215 285-4811

**ALTOONA CAMPUS**

Smith Building, Altoona, PA 16603  
 Area Code 814 946-4321

**BEAVER CAMPUS**

Brodhead Road, Monaca, PA 15061  
 Area Code 412 775-8830

**\*BEHREND COLLEGE**

Erie (Station Road, Wesleyville), PA 16563  
 Area Code 814 898-1511

**BERKS CAMPUS**

R.D. 5, Tulpehocken Road, P.O. Box 2150,  
 Reading, PA 19608  
 Area Code 215 375-4211

**\*CAPITOL CAMPUS**

Middletown, PA 17057  
 Area Code 717 448-6250

**DELAWARE COUNTY CAMPUS**

25 Yearsley Mill Road, Media, PA 19063  
 Area Code 215 565-3300

**DuBOIS CAMPUS**

College Place, DuBois, PA 15801  
 Area Code 814 371-2800

**FAYETTE CAMPUS**

P.O. Box 519, Uniontown, PA 15401  
 Area Code 412 437-2801

**HAZLETON CAMPUS**

Highacres, Hazleton, PA 18201  
 Area Code 717 454-8731

**MILTON S. HERSHEY MEDICAL CENTER**

500 University Drive, Hershey, PA 17033  
 Area Code 717 534-8521

**\*\*KING OF PRUSSIA CENTER**

Graduate Studies and Continuing Education  
 650 South Henderson Road  
 King of Prussia, PA 19406  
 Area Code 215 293-9860

**McKEESPORT CAMPUS**

University Drive, McKeesport, PA 15132  
 Area Code 412 678-9501  
 Area Code 412 462-6401

**MONT ALTO CAMPUS**

Mont Alto, PA 17237  
 (Waynesboro) Area Code 717 749-3111

**NEW KENSINGTON CAMPUS**

3550 7th Street Road, New Kensington, PA 15068  
 Area Code 412 339-7561

**OGONTZ CAMPUS**

1600 Woodland Road, Abington, PA 19001  
 Area Code 215 886-9400

**SCHUYLKILL CAMPUS**

State Highway, Schuylkill Haven, PA 17972  
 Area Code 717 385-4500

**SHENANGO VALLEY CAMPUS**

147 Shenango Avenue, Sharon, PA 16146  
 Area Code 412 981-1640

**WILKES-BARRE CAMPUS**

P.O. Box 1830, Wilkes-Barre, PA 18708  
 Area Code 717 675-2171

**WORTHINGTON SCRANTON CAMPUS**

120 Ridge View Drive, Dunmore, PA 18512  
 Area Code 717 961-4757

**YORK CAMPUS**

1031 Edgecomb Avenue, York, PA 17403  
 Area Code 717 771-4586

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\*Upper-division and graduate courses

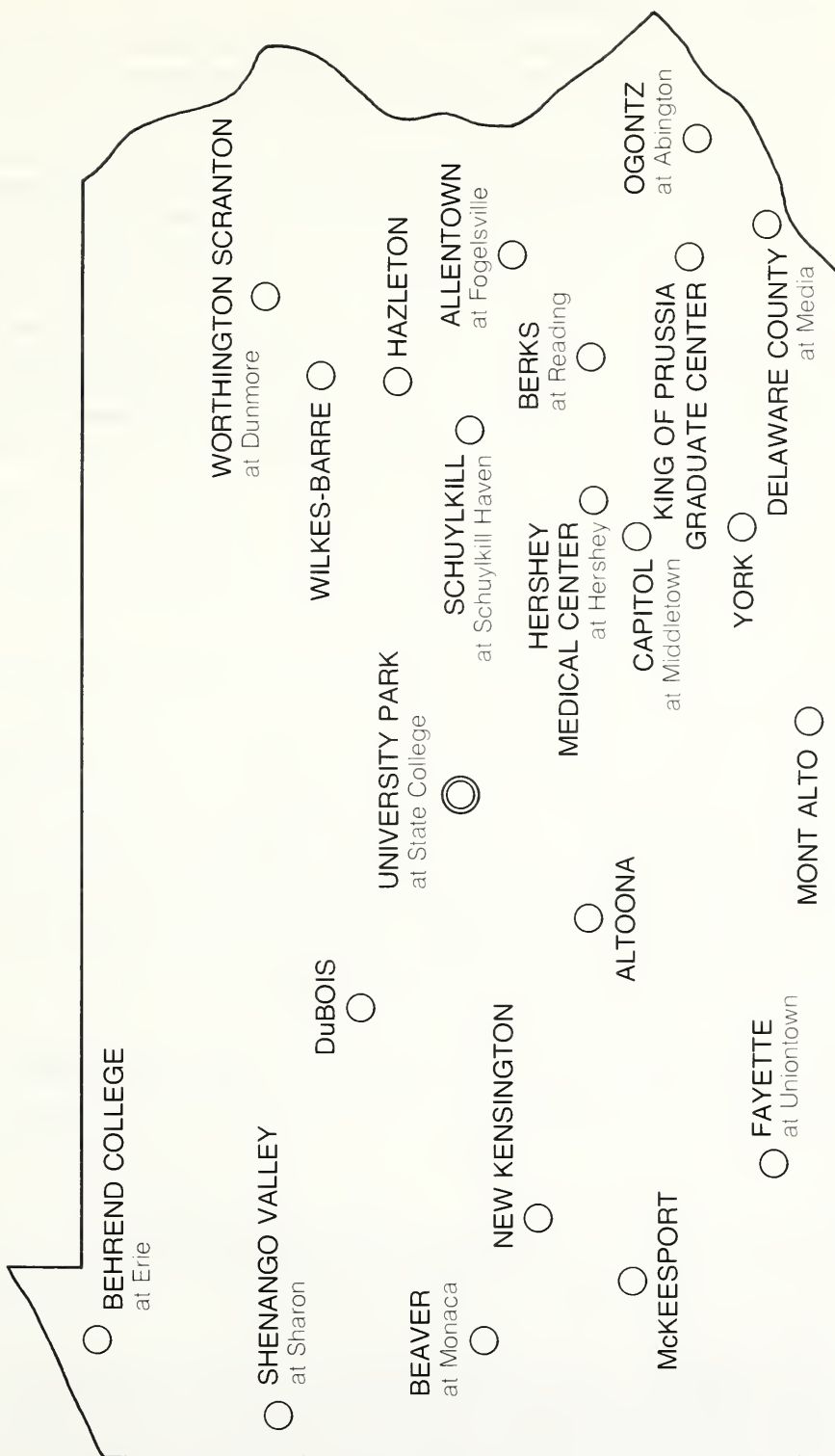
\*\*Graduate courses



LOCATIONS	ALTOONA	BEAVER	BEHREND COLLEGE	BERKS	DELAWARE COUNTY	DuBOIS	FAYETTE	HAZLETON	HERSHEY MEDICAL CENTER	McKEESPORT	MONT ALTO	NEW KENSINGTON	OGONTZ	SCHUYLKILL	SHENANGO VALLEY	UNIVERSITY PARK	WILKES-BARRE	WORTHINGTON SCRANTON	YORK	ASSOCIATE DEGREE MAJORS
	•	•	•	•	•	•	•	•		•	•	•	•	•	•		•	•	•	• Agricultural Business (1)
	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•	•	• Air Pollution Control Engr. Technology (2)
							•								•			•		Architectural Engineering Technology
	•	•		•	•	•	•	•		•		•	•	•	•		•	•	•	• Biomedical Equipment Technology (3)
		•	•	•	•	•	•	•		•	•	•	•	•	•		•	•		• Business Administration*
	•	•	•	•	•	•	•	•		•	•	•	•	•	•		•	•		• Chemical Engineering Technology (2)
									•											• Clinical Health Services +
				•	•		•													• Community Services*
	•	•			•					•		•		•				•		• Computer Science
																				• Dietetic Food Systems Management#
	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•		• Electrical Engineering Technology
											•									• Forest Technology
																	•			• Highway Engineering Technology
				•																• Hotel and Food Service
				•	•													•		• Labor Studies*
	•	•	•	•	•	•	•	•		•	•	•		•	•		•	•		• Letters, Arts, and Sciences*
					•															• Mass Communications — Journalism
	•	•	•	•		•	•	•		•		•	•		•		•	•		• Mechanical Engineering Technology
								•				•								• Medical Laboratory Technology (5)
															•					• Metallurgical Engineering Technology
	•					•	•	•				•		•			•	•		• Mining Technology (6)
	•	•	•	•	•	•	•	•		•		•	•	•	•		•	•		• Nuclear Engineering Technology (7)
								•												• Physical Therapist Assistance (9)
											•						•			• Railway Engineering Technology (4)
	•																			• Retailing
	•	•				•				•		•			•					• Science
												•								• Science — Radiologic Technologist Radiographer Option
						•		•							•	•				• Sociology*
							•								•			•		• Solar Heating and Cooling Technology (8)
											•						•			• Surveying Technology
	•	•		•	•	•	•	•		•		•	•	•	•		•	•		• Telecommunications Technology (4)
						•														• Wildlife Technology

- (1) Second year offered only at University Park  
(2) Second year offered only at Berks  
(3) Second year offered only at New Kensington and Wilkes-Barre  
(4) Second year offered only at Wilkes-Barre  
(5) Begins summer session at Hazleton and New Kensington  
(6) Second year offered only at Altoona, Fayette, and New Kensington  
(7) Second year offered only at Altoona and Hazleton  
(8) Second year offered only at Fayette  
(9) Begins summer session at Hazleton

\* Community Services, Labor Studies, and Sociology are offered as *extended degree* programs for students wishing to pursue part-time (day or evening) study. Letters, Arts, and Sciences also may be taken as an extended degree program at all University locations. Interested students should write to the Admissions Office or the nearest two-year campus to request a special application form for extended degree programs. Business Administration is offered at Ogontz primarily for evening students.  
+ This program has special admission requirements including 60 undergraduate credits from a regionally approved college or university or equivalent. Therefore, this program is not open to freshman applicants.  
# This program is available primarily through the Department of Independent Learning. For further information, write to the Department of Independent Learning, 128 Mitchell Building, University Park, PA 16802.



# THE UNIVERSITY

## MISSION OF THE UNIVERSITY

Penn State's fundamental responsibility is to provide programs of instruction, research, and public service, and thus act as an instrument of self-renewal and development for the Commonwealth. As Pennsylvania's land-grant university, Penn State must preserve and enhance its distinctive qualities.

While the modern university maintains links to the past and serves to maintain cultural values, its most extensive task at present is to help people to understand the great changes taking place in our society. People must have the skills and the learning habits that will make it possible for them to educate themselves over a lifetime. The rapid rate of change in contemporary society dictates that the University's programs adjust without undue delay to meet the needs of students and society.

University programs of research and other creative and scholarly activities are essential if the University is to contribute to the solution of the social, scientific, and technical problems of society and discharge effectively its upper-division and graduate teaching responsibilities. The University must also serve the Commonwealth directly through its programs of extension, continuing education, and other public service programs designed to meet the needs of citizens throughout the state.

By encouraging the enrollment of students from all segments of society and from other states and nations, the University provides the intellectual arena in which the search for rational solutions to societal problems can be nurtured, and in which teaching and learning can be the pivotal function. In performing this function, it is essential that the University foster independent thought and open discussion of alternatives.

## RESIDENT INSTRUCTION

The undergraduate degree programs of the University provide students with opportunities to increase their knowledge and understanding of the world, and to grow in their individual skills and capabilities for learning, analyzing, judging, creating, and communicating. All undergraduate degree programs and courses offered by the colleges of the University are under the academic sponsorship of a faculty committed to scholarship and are implemented under the academic policies and student rules established by the University Faculty Senate. They are intended to be flexible in accommodating students interested in learning, whether through traditional or non-traditional offerings, while enrolled on either a part-time or a full-time basis. The degree programs and courses of the colleges are offered through University administrative arrangements identified as Resident Instruction and Continuing Education.

The primary mission of Resident Instruction is to provide credit courses to degree candidates on University campuses as well as to administer certain off-campus credit-granting activities such as internships, practicums, field trips, and foreign studies. Students not formally admitted to degree candidacy (including provisional and nondegree students) may participate in Resident Instruction offerings as time and space permit.

## HISTORY

THE PENNSYLVANIA STATE UNIVERSITY, chartered by the Pennsylvania legislature as the Farmers' High School in 1855, was founded by professional men, educated farmers, and state and county agricultural leaders. A faculty of 4 met the incoming class of 69 students in February 1859.

In May 1862, the institution was renamed the Agriculture College of Pennsylvania, a name which recognized that its work was of collegiate level. Two months later, on July 2, President Abraham Lincoln signed the Morrill Land Grant Act offering each state free public land which it could sell to endow institutions of higher learning where "the leading object shall be, . . . to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

On April 1, 1863, the state legislature declared that the Morrill Act "is hereby accepted by the State of Pennsylvania with all its provisions and conditions and the faith of the State is hereby



pledged to carry the same into effect.” The legislature then designated Penn State as the land-grant college of the Commonwealth.

The College broadened the scope of its instruction, began to admit women students, increase its enrollment, and enlarge its physical plant. Graduate work was offered as early as 1862. In 1874 the College was renamed the Pennsylvania State College.

In 1953 the name was changed again—to The Pennsylvania State University—in formal recognition of what Penn State had long since become, one of the country’s leading universities. Its ten undergraduate colleges now offer 125 baccalaureate and 31 associate degree majors. In addition, Behrend College, in Erie, offers 18 complete baccalaureate programs. The Capitol Campus, near Harrisburg, offers 13 baccalaureate degree majors. Graduate students may choose from 127 approved fields of study. The College of Medicine, at The Milton S. Hershey Medical Center in Hershey, offers the M.D. degree, the M.S. and Ph.D. in anatomy, biological chemistry, genetics, microbiology, pharmacology, and physiology, the M.S. degree in laboratory animal medicine, and the associate degree in Clinical Health Services.

The original student body of 69 has grown to 65,091, the faculty of 4 to 3,630. Beginning with an educational program which offered 40 courses, Penn State today offers 4,906 undergraduate and 2,689 graduate courses. The University, whose prime purpose has always been to serve the people and the interests of the Commonwealth and the nation, is accredited by the Middle States Association and is a member of the Association of American Universities.

## ACADEMIC ORGANIZATION OF THE UNIVERSITY

### THE COLLEGES

The University has ten colleges that offer undergraduate majors leading to baccalaureate and associate degrees: College of Agriculture, College of Arts and Architecture, College of Business Administration, College of Earth and Mineral Sciences, College of Education, College of Engineering, College of Health, Physical Education, and Recreation, College of Human Development, College of the Liberal Arts, and College of Science. In addition, Capitol Campus at Middletown and Behrend College at Erie provide an alternative educational setting in which students may enroll in selected degree programs.

### THE COMMONWEALTH EDUCATIONAL SYSTEM

The Commonwealth Educational System is the administrative organization for the University’s system of Commonwealth Campuses and for the delivery of continuing education programs throughout the Commonwealth. Through the seventeen Commonwealth Campuses and the Continuing Education offices at University Park, Behrend College, Capitol Campus, Hershey, King of Prussia, and Williamsport, the Commonwealth Educational System offers a wide array of University courses and programs at locations convenient to virtually all of the population of the Commonwealth.

**COMMONWEALTH CAMPUSES**—In addition to the University Park Campus in the municipality of State College, Behrend College in Erie, and Capitol Campus in Middletown, full-time instruction is available at seventeen Commonwealth Campuses: Allentown, Altoona, Beaver (Monaca), Berks (Reading), Delaware County (Media), DuBois, Fayette (Uniontown), Hazleton, McKeesport, Mont Alto, New Kensington, Ogontz (Abington), Schuylkill (Schuylkill Haven), Worthington Scranton (Dunmore), Shenango Valley (Sharon), Wilkes-Barre, and York.



## TWO-YEAR ASSOCIATE DEGREE MAJORS

Majors which lead to two-year associate degrees are available at Behrend College and all seventeen of the University's Commonwealth Campuses except Allentown as listed on page 8 of this bulletin. These majors provide concentrated instruction to prepare graduates for specialized occupational assignments, except for the Letters, Arts, and Sciences program, which provides graduates with a general education and some specialization in their fields of interest. In addition, a program in Clinical Health Services is available at the Hershey Medical Center, and a program in Dietetic Food Systems Management is available primarily through the Department of Independent Learning.

Thirty-two associate degree programs lead to either the Associate in Arts degree, the Associate in Engineering degree, or the Associate in Science degree. The majors leading to these degrees are listed below.

### *Associate in Arts Degree*

Labor Studies  
Letters, Arts, and Sciences  
Mass Communications—Broadcasting  
Mass Communications—Journalism  
Sociology

### *Associate in Engineering Degree*

Air Pollution Control Engineering Technology  
Architectural Engineering Technology  
Biomedical Equipment Technology  
Chemical Engineering Technology  
Electrical Engineering Technology  
Highway Engineering Technology  
Mechanical Engineering Technology  
Metallurgical Engineering Technology  
Mining Technology  
Nuclear Engineering Technology  
Railway Engineering Technology  
Solar Heating and Cooling Technology  
Surveying Technology  
Telecommunications Technology

### *Associate in Science Degree*

Agricultural Business  
Business Administration  
Clinical Health Services  
Community Services  
Computer Science  
Dietetic Food Systems  
Management  
Forest Technology  
Hotel and Food Service  
Medical Laboratory Technology  
Physical Therapist Assistance  
Retailing  
Science  
Wildlife Technology

A description of the purposes, objectives, and content of each of the two-year majors is given on succeeding pages.

Most of Penn State's associate degree enrollment at present is concentrated in its engineering technology majors. The engineering technology graduate, a specialist in applied rather than theoretical engineering, is equipped to translate creative ideas into new machines, products, structures, and processes. He or she understands the basic scientific principles which are the tools of the graduate engineer and is acquainted with the production tools and materials of the skilled worker.

The Commonwealth Campuses and Behrend College also offer up to two years of work in most of the four-year baccalaureate degree majors offered by the University.

**STATEMENT OF BASIC ACADEMIC ADMISSIONS POLICIES**—Admission to the University credit courses or degree candidacy at The Pennsylvania State University is governed by policies established by the University Faculty Senate. Although specific applications of these policies may vary from year to year, from location to location, and from program to program, all University admissions are governed by the following general policies:

1. As an institution of higher education, The Pennsylvania State University is committed to making post-high school education available to all who possess a high school diploma or its equivalent without restriction as to race, sex, religion, color, ancestry, national origin, ethnic origin, or handicap or age as provided by law.
2. The primary responsibility of the University is to residents of the Commonwealth of Pennsylvania. Consequently, within limits expressed from time to time by the Board of Trustees

of the University, preference shall be given to Pennsylvania residents in the various admission processes.

3. In order to meet the variety of goals and objectives of the population, the spectrum of offerings is designed to enable persons with a variety of objectives — both degree and nondegree — to receive higher education. Although access to educational opportunities of the University is open to all, courses offered for credit are available to those holding a high school diploma or its equivalent. Policies governing admission to degree candidacy are established by the University Faculty Senate (with delegation of policies governing admissions to graduate programs to the Graduate Faculty of the University) under a general policy of offering admissions to those whose past academic performance indicates a reasonable probability of success.
4. Undergraduate students are admitted to either baccalaureate degree candidacy or associate degree candidacy. To be admitted to degree candidacy, the individual must present an academic performance record which indicates a reasonable probability of his or her success in his or her chosen program. In the case of freshman admission to undergraduate degree candidacy, performance is measured through the high school record and standardized test results. In the case of advanced standing admission, performance is measured either through success in nondegree programs and courses of the University or by success at some other institution of higher education.
5. Within the space available in particular programs and at particular locations, admissions shall be offered preferentially to those whose performance record indicates the highest probability of success in the chosen program—with this process continuing until all available spaces are filled. Although exceptions to this policy may be made from time to time (for example, recipients of scholarships with restricting qualifications), these exceptions may be made only for students who meet at least the minimum admission and entrance requirements.
6. If a college requires restrictions on its baccalaureate admissions, the priorities or quotas established must include provisions to consider qualified students in each of these groups:
 

Admissions Group I—Freshman Admissions: Students who hold a high school diploma or equivalent, who present fewer than 18 credits of baccalaureate work (from The Pennsylvania State University or another accredited institution), who meet minimum college entrance requirements, and who meet minimum college admission standards are considered in this group.

Admissions Group II—Penn State Advanced Standing Admissions: Students who (1) request baccalaureate degree readmission, presenting 18 or more credits; (2) request a change from The Pennsylvania State University associate degree to baccalaureate degree status, presenting 18 or more applicable credits (including Type II, The Pennsylvania State University associate degree graduates); or (3) request a change from The Pennsylvania State University provisional degree to baccalaureate degree status, presenting 18 or more applicable credits, are considered in this group. In all Penn State advanced standing admissions, it is understood that the student must have a G.P.A. of at least 2.00 and meet the minimum entrance and advanced standing requirements of the college.

Admissions Group III—Other Advanced Standing Admissions: Students who (1) request changes from The Pennsylvania State University nondegree to baccalaureate degree status, presenting 18 or more applicable credits; or (2) have not been students at Penn State and request baccalaureate degree status at Penn State, presenting 18 or more applicable credits. In all advanced standing admissions it is understood that the student must have a G.P.A. of 2.00 and meet the minimum entrance and advanced standing requirements of the college.

Within these three groups, no special consideration will be given to any group; students will be admitted to the college on the basis of academic competition (e.g., SAT scores, grade-point averages, grades in required courses in the college, and other evidence predictive of baccalaureate degree performance where available, valid, and reliable).
7. To assure a proper educational mix of students and to further broaden the educational opportunities offered by the University, the University Faculty Senate and the University administration may from time to time authorize various specialized programs. These programs may permit students who do not meet the basic qualifications for admission to degree candidacy to be admitted to such candidacy. These programs may also permit, in



## GENERAL INFORMATION

selected situations, exceptional students who have not earned a high school diploma or its equivalent to enroll in University credit courses. Such specialized programs may include up to 10 percent of the total admission group for the University in any one year and up to a maximum of 15 percent of the admission to any geographic location of the University.

8. Within this general policy, colleges of the University, with the concurrence of the University Faculty Senate, may impose certain educational background requirements (Carnegie Units) which must be completed by an individual before being admitted to degree candidacy.

**ADMISSION REQUIREMENTS—*Freshman Admission***—A person who holds a high school diploma or its equivalent, and who has not taken credit courses at an institution of higher learning, or a person who holds a high school diploma or its equivalent and who has taken less than 18 semester credits at an accredited college or university may be considered for admission as a freshman.

Applicants for admission to all associate degree programs must submit scores of the Scholastic Aptitude Test of the College Entrance Examination Board.

All applications should be addressed to the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802. Telephone: (814) 865-5471.

The University reserves the right to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

An applicant must state in writing whether he or she has attended any other institution of higher learning, even though advanced standing is not desired. Failure to indicate, at the time of registration, previous registration in another institution invalidates the admission.

To be admitted to degree candidacy, the applicant must have completed certain educational background requirements, called Carnegie Units or secondary school units. To determine whether you have the appropriate secondary school units required for your choice of a program of study, refer to page 17 to the program of your choice. Then read across to determine the necessary units.

***Admission with Advanced Standing***—An applicant who has attempted at least 18 semester credits at an accredited college or university and has a minimum cumulative grade-point average of at least 2.00 (on a 4.00 scale) for all graded courses at all colleges and universities previously attended may be considered for admission with advanced standing.

In all cases where work has been taken at other institutions, an official transcript from each place of attendance must be submitted directly to the Undergraduate Admissions Office by the institutions attended. The latter must include evidence that the student was honorably dismissed and was in good academic standing at the time of leaving.

Advanced standing credits may be awarded for work taken at fully accredited institutions provided the grade earned is equivalent to a grade of A, B, or C at this University, and the credits are useful to the student's program of study. In certain circumstances, the University may need to restrict advanced standing admissions in particular programs because of space limitations.

Associate degree programs have a limit on the number of credits that may be accepted by transfer from accredited institutions. Information on credit limitations may be obtained from the academic official responsible for a particular program.

Credits are transferred, but grades and grade points are not. Advanced standing students enter the University without an average, and their average begins with the completion of their first semester of study at Penn State.

***Provisional Student (Degree-Seeking)***—An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admission as a degree candidate may enroll in credit courses at the University. A provisional student may enroll in credit courses if the following criteria are met:

1. The student is making satisfactory progress toward admission as a degree candidate. Progress is satisfactory if a student has earned 18 credits with a minimum grade-point average of 2.00 (on a 4.00 scale). If a student attempted 18 credits and earned less than 2.00, the student is given a warning. A student who has earned 27 credits with a grade-point average of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent

semester. No student, regardless of cumulative grade-point average, who has completed 36 credits will be permitted to enroll as a provisional student in any subsequent semester.

2. There is space available after degree candidates have been accommodated.
3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons may petition for an exception to the policy.

A provisional student may apply to become an associate degree candidate after completing 9 credits of Penn State course work with a minimum grade-point average of 2.00. All these credits must be earned at this university. The applicant must also satisfy the entrance requirements of either the major in which enrollment is desired or of the Division of Undergraduate Studies if the student wishes to enroll in that division. An applicant who has completed at least the equivalent to one year's associate degree work before applying for admission as an associate degree candidate must have the approval of either the dean of the college in which enrollment is desired or of the director of the Division of Undergraduate Studies if the student wishes to enroll in that division. After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a provisional student may be used to fulfill the degree requirements.

*Nondegree Student*—An applicant holding a high school diploma or its equivalent may be permitted to enroll in credit courses (either for credit or audit) at the University.

The academic policy governing registration by nondegree students is being reevaluated by the University Faculty Senate. When approved, the policy will be printed in the *Student Handbook* (Policy 14-00) and will become effective at the beginning of fall semester 1983.

A nondegree student may apply to become an associate degree candidate after completing 9 credits of Penn State course work with a minimum grade-point average of 2.00. All of these credits must be earned at this university. The applicant must also satisfy the entrance requirements of either the major in which enrollment is desired or of the Division of Undergraduate Studies if the student wishes to enroll in that division. An applicant who has completed at least the equivalent to one year's associate degree work before applying for admission as an associate degree candidate must have the approval of either the dean of the college in which enrollment is desired or of the director of the Division of Undergraduate Studies if the student wishes to enroll in that division. After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a nondegree student may be used to fulfill degree requirements.

Note: Provisional students (degree-seeking) and nondegree students are subject to the same tuition charges as regular students. The Academic Policies and Procedures approved by the University Faculty Senate apply to provisional and nondegree students as stated.

An individual desiring to take associate degree courses as a provisional student (degree-seeking) or nondegree student should submit the appropriate application for admission. An application form may be obtained from the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802, or from the office of the director of any Commonwealth Campus of The Pennsylvania State University.

**BASIC SKILLS** — All students entering the freshman class in an associate degree program are tested for basic skills in English composition, reading, and mathematics.

Students identified with major weaknesses in English composition are required to enroll in English 4 (3 credits) prior to scheduling English 15. Students with reading and/or mathematics weaknesses are encouraged to strengthen these skills through other available University resources.

Students are encouraged through the Basic Skills Program to overcome possible difficulties early in their college careers to ensure greater success with their academic studies.



## GENERAL INFORMATION

**DIVISION OF UNDERGRADUATE STUDIES**—This division is an academic unit of the University which offers at the Commonwealth Campuses, Behrend College, and University Park the following programs and services:

*Freshman Testing, Counseling, and Advising Program*—All new freshmen admitted to the University are provided comprehensive testing, counseling, and academic advising prior to attending first-semester classes. The purpose of the program is to provide all new students with assistance in evaluating their educational plans and objectives.

*Enrollment*—New freshmen who prefer to test their abilities and interests or who wish to explore several areas of study before identifying themselves with one of the University's colleges can request to begin their studies in the Division of Undergraduate Studies. At any time in their academic careers, students whose interests or career objectives change can request that they be enrolled in 2-DUS (Division of Undergraduate Studies). Specialized academic advising in DUS accompanies students' attendance in regular courses until students choose a new program and meet its academic standards for transfer.

*Advising and Counseling*—All students, whether or not they are enrolled in the Division of Undergraduate Studies, have available to them the professional advising, counseling, and referral services provided by the division. Such services are a supplement to and are coordinated with the advisory services of the colleges and faculty. Provisional students aspiring for degree programs are also served by this unit.

*Undergraduate Academic Information*—The Division of Undergraduate Studies provides a comprehensive academic information support system throughout the University to assist faculty in their student advisory responsibilities. DUS academic information centers are located at every Commonwealth Campus and in the colleges at University Park.

**GRADING SYSTEM**—Grades shall be reported by the following symbols: A, B, C, D, and F.

<i>Grade</i>	<i>Quality of Performance</i>	<i>Grade-Point Equivalent</i>
A	Excellent	4.00
B	Good	3.00
C	Satisfactory	2.00
D	Poor	1.00
F	Failure	0

**GRADUATION REQUIREMENTS**—In order to graduate, a student must complete the course requirements of the major and earn at least a C average (a grade-point average of 2.00) for all courses.

**DEGREES**—The associate degree majors outlined in this catalog lead to the following degrees: Associate in Arts, Associate in Engineering, and Associate in Science.

## SECONDARY SCHOOL UNITS REQUIRED FOR ADMISSION CONSIDERATION TO ASSOCIATE DEGREE PROGRAMS

	English	Math. (A)*	Math. (B) +	Math. (C)**	Science	Other Subjects	Total
Agricultural Business	3					12	15
Air Pollution Control Engineering Technology	3	2				10	15
Architectural Engineering Technology	3	2				10	15
Biomedical Equipment Technology	3	2				10	15
Business Administration (2-year)	3		2			10	15
Chemical Engineering Technology	3	2				10	15
Clinical Health Services	3			2	2 + +	8	15
Community Services	3					12	15
Computer Science	3	2				10	15
Dietetic Food Systems Management	3					12	15
Electrical Engineering Technology	3	2				10	15
Forest Technology	3		2			10	15
Highway Engineering Technology	3	2				10	15
Hotel and Food Service	3					12	15
Labor Studies	3					12	15
Letters, Arts, and Sciences	3					12	15
Mass Communications-Broadcasting	3					12	15
Mass Communications-Journalism	3					12	15
Mechanical Engineering Technology	3	2				10	15
Medical Laboratory Technology	3	2			2 + +	8	15
Metallurgical Engineering Technology	3	2				10	15
Mining Technology	3	2				10	15
Nuclear Engineering Technology	3	2				10	15
Physical Therapist Assistance	3		1 ‡		1 #	10	15
Railway Engineering Technology	3	2				10	15
Retailing	3					12	15
Science (2-year)	3	2				10	15
Radiologic Technologist Radiographer	3	2				10	15
Sociology (2-year)	3					12	15
Solar Heating and Cooling Technology	3	2				10	15
Surveying Technology	3	2				10	15
Telecommunications Technology	3	2				10	15
Wildlife Technology	3		2			10	15

\*Math. (A) requirements may be satisfied by at least 2 units of mathematics: 1 unit of algebra, and 1 additional unit in any combination of advanced algebra, plane geometry, solid geometry, or trigonometry.

+ Math. (B) requirements may be satisfied by any 2 units of mathematics, but it is strongly recommended that the 2 units be 1 of algebra and 1 of plane geometry.

\*\*Math. (C) requirements may be satisfied by 1 unit of algebra and 1 additional unit in mathematics.

+ + Biology and chemistry are recommended.

‡The one unit of mathematics should be in algebra. It is strongly recommended that one additional unit of mathematics be completed.

#The one unit of science should be in biology. It is strongly recommended that one additional unit of science be completed.

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**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE UNIVERSITY PARK CAMPUS**—Credits received for 800-series courses may be applicable to a particular baccalaureate degree program listed in the current baccalaureate degree bulletin of The Pennsylvania State University at the discretion of the appropriate college and major department.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE CAPITOL CAMPUS**—In addition to receiving an education to prepare for employment, the graduate of an associate degree program may also qualify for admission to various programs leading to a baccalaureate degree from Penn State's Capitol Campus. Those anticipating admission to Capitol Campus should inquire at the Capitol Campus Admissions Office late in their freshman year or early in their sophomore year concerning baccalaureate program course requirements.

Graduates from associate degree programs in Business Administration or Computer Science may wish to consider further study at Capitol Campus in a Business Administration baccalaureate degree program.

Graduates of the associate programs of Air Pollution Control Engineering Technology, Architectural Engineering Technology, Biomedical Equipment Technology, Chemical Engineering Technology, Electrical Engineering Technology, Highway Engineering Technology, Mechanical Engineering Technology, Metallurgical Engineering Technology, Mining Technology, Nuclear Engineering Technology, Railway Engineering Technology, Solar Heating and Cooling Technology, Surveying Technology, and Telecommunications Technology may wish to consider continuing at the Capitol Campus in a program of study in engineering technology leading to a Bachelor of Technology degree in Building Construction Technology, Electrical Design Engineering Technology, Energy Technology, Mechanical Design Engineering Technology, or Water Resources Engineering Technology.

The following associate degrees are also acceptable toward admission to programs leading to a baccalaureate degree at Capitol Campus: Letters, Arts, and Sciences; Mass Communications-Broadcasting; Mass Communications-Journalism; and Sociology.

## STUDENT WELFARE

**ORIENTATION PROGRAM**—At the opening of the fall semester all new students participate in an orientation program. In addition to becoming acquainted with the new environment in which they will live and study, students receive instruction and counseling concerning their courses of study, participation in extracurricular activities, and the cultural opportunities open to them. Registration is also held during this period.

**STUDENT GOVERNMENT**—Representative student leadership is provided on each campus of the University by a student government association which functions through officers and representatives elected from and by the student body. In addition to their involvement in student programs at their local campuses, student officers and delegates from University campuses convene several times annually. These meetings provide for an exchange of information among the various student government associations and for system-wide coordination in student government and student activities.

**STUDENT CONDUCT**—The University regards as serious offenses all acts of unethical, immoral, dishonest, or destructive behavior, as well as violations of University regulations as set forth in each campus's student handbook and in the *Policies and Rules for Students*, a copy of which is available to each student upon registration.



**INSURANCE PROTECTION WHILE ATTENDING THE UNIVERSITY**—Any student who desires insurance protection while in attendance at the University (1) for accident and health and/or (2) for loss of property by fire or theft should arrange personally for whatever insurance seems desirable through an agency of his or her choice. Accident and health programs are available under the sponsorship of the Undergraduate or Graduate Student Government Organization.

**STUDENT ACCIDENT / TRIP INSURANCE**—Short-term group trip accident insurance is available to students who are not otherwise covered. Students taking course-connected class trips, or taking group trips with a student organization registered with the Office of Student Activities, may obtain around-the-clock coverage for accidental death and dismemberment, as well as accidental medical expenses. This insurance is available for the duration of the trip. Information about obtaining coverage and paying premiums is available from your instructor, campus business office, or the University risk manager.

**HEALTH SERVICES**—The University Health Service assists in promoting and maintaining the health of students.

Every new full-time student must successfully complete a physical examination before being permitted to register for classes at the University.

The health services of the University are made available to students in accordance with a statement provided by each campus, pertinent to that campus, and published in its student handbook.

The University does not obligate itself for payment of medical services other than those provided by personnel employed or retained by the University and in facilities owned or contracted for by the University. Treatment provided in contract facilities must be authorized by the campus director, dean of student affairs, or nurse.

Students are urged to protect themselves against medical expenses that may result from injury or illness by arranging for personal insurance coverage.

**CAREER DEVELOPMENT AND PLACEMENT**—The Career Development and Placement Center assists students in continual evaluation of their educational and career plans as they progress through college and helps them identify sources of personal or academic difficulty which may interfere with their progress. Individual as well as group educational and career counseling programs are available to students.

A Student Affairs staff member at each campus has responsibility for providing placement assistance for associate degree graduates. Services include bringing employers to the campus to interview graduates for permanent employment, providing job information, and assisting students in preparing for job interviewing. The Career Development and Placement Center at the University Park Campus supplies prospective employers (national, state, and local) with information concerning the associate degree programs and works cooperatively with the Commonwealth Campuses in assisting graduates to locate suitable employment.



# STUDENT AID

In addition to the student aid information provided below, students may wish to consult the admissions booklet "It Takes Two" sent to all applicants and the "Penn State Student Financial Aid" brochure available upon request. Additional questions should be directed to the Office of Student Aid, 335 Boucke Building, on the University Park Campus, or to the Office of Student Affairs at a Commonwealth Campus.

## AID PROGRAMS AVAILABLE TO ASSOCIATE DEGREE CANDIDATES

### GRANTS (aid sources not requiring repayment)

*Pell Grant* (formerly Basic Educational Opportunity Grant)—The Pell Grant is the major federal grant program available to undergraduates. This award is available to undergraduates pursuing their first baccalaureate or associate degree on at least a half-time basis (6 credits per semester).

*Pennsylvania Higher Education Assistance Agency Grant (PHEAA)*—This is a grant established by the Commonwealth to assist undergraduates who have a financial need as defined by PHEAA guidelines. Applicants must be residents of Pennsylvania.

NOTE: Non-Pennsylvania students should contact their state higher education assistance agencies for information on state grants available for attending Penn State. Names and addresses of higher education assistance agencies are available from the Office of Student Aid, 335 Boucke Building, or the Office of Student Affairs at Commonwealth Campuses.

*Supplemental Educational Opportunity Grant (SEOG)*—This grant is available to undergraduates with high documented financial need. It is normally awarded in combination with the College Work Study Program or the National Direct Student Loan.

### LOANS

*Guaranteed Student Loan Program (GSL)*—The GSL is a federally subsidized loan program, available through banks, savings and loan associations, and other private lenders, which offers students attending on at least a half-time basis the opportunity to borrow money for their education. An undergraduate may borrow up to \$2,500 per year with a maximum of \$12,500 for undergraduate studies. All students must file a needs test form with the GSL application to determine loan eligibility. Needs test forms are available from lending institutions with loan applications or from the Office of Student Aid at University Park or the Office of Student Affairs at Commonwealth Campuses. Students from families with an adjusted gross income greater than \$30,000 are eligible for GSL assistance based on documented financial need. Repayment begins six months after the termination of the student's education at an interest rate of 9 percent per year simple interest.

*PLUS Loan*—This is an educational loan available to parents of dependent undergraduate students. It is also available to independent undergraduates and to graduate students. Similar to the GSL program, funds are provided by private lenders such as hometown banks, etc. The interest rate is 12 percent. Repayment of the loan begins within sixty days. Student borrowers may defer repayment of principal until six months after termination of studies.

*National Direct Student Loan (NDSL)*—This program provides loans of up to \$1,500 per year with an overall maximum of \$6,000 for undergraduate students with documented financial need. Repayment starts six months after termination of the student's education at an interest rate of 5 percent per year simple interest. Postponement of repayment and loan cancellation may be arranged for certain types of employment following graduation.

*University Loans*—University loans are funds established by donors to help students who have a

documented financial need. These loans help needy students meet the educational and living expenses required to attain a college degree. Repayment starts immediately after the student completes his or her studies at a simple interest rate of 6 percent per year. Simple interest accrues at 6 percent during the in-school period and any subsequent deferment period.

## EMPLOYMENT

*College Work Study Program (CWSP)*—The CWSP is a form of federal aid which allows a student to earn a portion of the documented financial need through approved CWSP jobs. This is a nonrepayable source of aid since the student is paid an hourly wage for his or her employment.

*Student Employment*—Students who are interested in part-time employment on campus or in the State College area should contact the Student Employment Office, 301A Boucke Building, University Park, PA 16802, or contact the dean of student affairs at Commonwealth Campuses. Earnings from University employment must, according to federal regulations, be considered an aid resource which will be counted toward meeting a student's financial need.

## SCHOLARSHIPS

*University Scholarships*—University scholarships are awarded on the basis of superior high school or college academic performance and, in most cases, documented financial need. They are awarded either by the scholarship committees in the various academic colleges of Penn State, by the Freshman or Faculty Senate Scholarship Committee, or the Commonwealth Campus Scholarship Committees.

## HOW TO APPLY

After completing the application for admission to the University, each student seeking aid consideration should complete the forms necessary for each aid program being sought.

### I. Aid Awarded by the Federal Government

#### Pell Grant

(All undergraduate students)

Students who have completed the application for Pennsylvania State Grant and Federal Student Aid or the Financial Aid Form (FAF) are considered for the Pell Grant program. After receiving the Student Aid Report (SAR), which designates eligibility for a Pell Grant, follow the instructions contained on the SAR to finalize the award. Applications are available from high school guidance counselors, the Office of Student Aid, or the dean of student affairs at Commonwealth Campuses. They should be completed as soon after January 1 as possible. Transfer students must request a Financial Aid Transcript to be sent to the Office of Student Aid, 335 Boucke Building, University Park, PA 16802, from each institution previously attended.

### II. Aid Awarded/Coordinated by the States

PHEAA Grant (Pennsylvania residents only)

Other state grant/scholarship programs

Guaranteed Student Loan

PLUS Loan

(Undergraduates)

Pennsylvania residents should complete the application for Pennsylvania State Grant and Federal Student Aid. Students currently receiving PHEAA grants will receive renewal applications by mail from the PHEAA agency. Regular applications are available from high school guidance counselors, the Office of Student Aid, and the dean of student affairs at Commonwealth Campuses in addition to the Pennsylvania Higher Education

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Assistance Agency. Applications should be completed as soon after January 1 as possible. Non-Pennsylvania students should contact their state's Higher Education Agency for information on aid programs available to them as Penn State students.

(PA and non-PA residents)

Contact a local bank or lending institution for application forms for the Guaranteed Student Loan Program and the PLUS Loan. After completing the forms, submit them to the Office of Student Aid, 335 Boucke Building, University Park, PA 16802, along with a stamped envelope addressed to the lender. Students should allow six to eight weeks for the processing of their loan application.

### III. Aid Awarded by The Pennsylvania State University

Supplemental Educational Opportunity Grant (SEOG)

National Direct Student Loan (NDSL)

College Work Study Program (CWSP)

University loans and scholarships

(All students)

Complete the application for Pennsylvania State Grant and Federal Aid or the Financial Aid Form (FAF).

Note: Freshman students need only to complete one of the above forms to be considered for aid awarded by Penn State. Both forms are available from high school guidance counselors, the Office of Student Aid, or the dean of student affairs at Commonwealth Campuses. The recommended filing date for consideration is February 15; however, students are encouraged to submit applications as soon after January 1 as possible.

(All students except entering freshmen)

Complete the Office of Student Aid's Financial Aid Application. Students may indicate on this application the type of aid they are seeking, with the exception of University scholarships. File by April 1. The application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

(All students except entering freshmen)

Complete the University Scholarship Application. Since funds are limited, applications are only encouraged from those students with a cumulative grade-point average of 3.00 or higher. File by April 1. This application is available from the Office of Student Aid or the dean of student affairs at Commonwealth Campuses.

(Transfer students only)

Complete a Financial Aid Transcript. It is necessary for the University to know if you received aid at any other institution prior to enrolling at Penn State. Request this form from the Office of Student Aid.

### IV. Private Aid Sources

All students are urged to explore local scholarship/grant opportunities as well as any private low-interest loan funds offered by local employers and civic organizations.

## HOW MUCH DOES IT COST TO ATTEND PENN STATE?

One of the major concerns of students and their parents is knowing how much it will cost to attend Penn State for an academic year. The following itemized listing of expenses, although prepared for the 1982-83 academic year (at that time, three 10-week terms), may be used as a basic guide for your planning. Students may find that some of the costs vary according to individual needs and circumstances.



## STUDENT BUDGET — 1982-83

	<i>Residence Halls or Off-Campus Housing (All Campuses)</i>	<i>Living at Home</i>
Commonwealth Campus Tuition	\$1,827*	\$1,827*
Room & Board	2,274	1,100
Books & Supplies	300	300
Clothing & Laundry, Transportation, Personal Maintenance, Medical, & Recreation	1,743	2,206
Total*	\$6,144	\$5,433

\*For non-Pennsylvania residents the nonresident undergraduate tuition figure of \$4,254 should be substituted. The total estimated budget for an out-of-state undergraduate student at University Park Campus or a Commonwealth Campus is \$8,571.

The 1982-83 tuition at University Park is \$2,118. The tuition at Behrend College is \$2,010.

## STUDENT AID POLICIES

The Office of Student Aid at Penn State administers and coordinates the aid programs according to applicable federal and state regulations and University policies which guarantee each student equal access to financial assistance. The Office of Student Aid employs the standard need analysis services of the College Scholarship Service and the Pennsylvania Higher Education Assistance Agency to assess the aid eligibility of student applicants, ensuring equity of treatment among all applicants. The University does not discriminate on the basis of race, creed, color, national origin, handicap, age, or sex in any of its policies, practices, or procedures.

Eligibility for aid is contingent upon the student's financial need for assistance to meet educational costs. Each program has specific eligibility requirements which must be met before funds are awarded. In addition to financial need as a criterion for receiving aid, a student must be enrolling as a degree or provisional student. Nondegree students are not eligible to receive aid at Penn State. The University may require an official copy of the Federal Income Tax Form 1040 to verify eligibility for aid.

The Office of Student Aid assumes that all aid applicants will keep apprised of all application deadlines pertaining to the aid sources they are seeking. Because limited funds are available, applications filed after the applicable deadline dates are considered only as funds permit. On-time applicants receive first consideration. Some aid programs have flexible application deadlines which permit students to receive consideration at most times during the year (for example, the GSL and Pell Grant programs). Current and prospective aid recipients are strongly encouraged to keep well informed of aid application procedures through aid publications, news media, and agencies providing aid information such as the Office of Student Aid at University Park and the Office of Student Affairs at Commonwealth Campuses.

Aid is never automatically awarded for subsequent years. Students must reapply each year for funds. Students who plan to attend the summer session must file separate applications to be considered for almost all aid programs. The major exceptions to this requirement are as follows:

1. Entering freshmen seeking aid awarded by the University (see "How to Apply" above) must file only the application for Pennsylvania State Grant and Federal Student Aid or the FAF to receive consideration for the summer session if they have been admitted to the University specifically to begin during the summer session; and
2. The Pell Grant program has no separate summer application and is generally awarded to students during the fall-spring academic year. (Pell Grant recipients not attending the entire fall-spring year should contact the Office of Student Aid to determine if a summer payment is possible.)

One of the goals of the Office of Student Aid is to help financial aid recipients receive a financial aid package which will attempt to meet the student's documented financial need. The financial aid package can be composed of federal aid, state grant monies, private award sources,



## GENERAL INFORMATION

or any other source of funds available to the student, including earnings from University employment.

It is the responsibility of the Office of Student Aid, however, to assure the federal government that federal aid recipients will not be permitted to retain financial aid *exceeding* the students' need. Students should be aware that if the aid received is in excess of need, they will be notified of their responsibility to return the excess amount to the University.

### FEDERAL STUDENT ASSISTANCE SATISFACTORY ACADEMIC PROGRESS STANDARD

Satisfactory academic progress must be maintained for continued consideration for federal financial assistance at Penn State. Students must comply with the following to insure continued consideration:

1. Minimum standards for satisfactory scholarship established by Senate Policy Section 54-54 of the *Academic Policies and Procedures for Undergraduate Students* published in the *Penn State Student Handbook*.
2. Meet minimum semester credit level expectations per academic grade level as published in the *Penn State Student Handbook*.
3. Complete the requirements for the associate degree within five semesters.

Exceptions to the above and information concerning reinstatement of aid, course audits, deferred grades, and course repeats may be obtained by contacting the Office of Student Aid, 335 Boucke Building.

## ESTIMATED TUITION, ROOM, BOARD, AND OTHER CHARGES

*NOTE: The University reserves the right to revise tuition, room, board, and other charges without further notice. Tuition and charges for baccalaureate and graduate programs are listed separately in the Baccalaureate Degree Programs, Graduate Degree Programs, and Capitol Campus bulletins. Penn State has two semesters and a summer session. Students normally attend two semesters per year. The tuition and charges set forth below are estimated. The actual tuition and charges for the 1983-84 academic year will not be available until the summer of 1983.*

**TUITION**—Tuition per semester for associate degree students:

	<i>Pennsylvanians</i>	<i>Non-Pennsylvanians</i>
12 or more credits:		
University Park Campus	\$1,059.00	\$2,127.00
Commonwealth Campuses	913.50	2,127.00
Behrend College	1,005.00	2,127.00
11 or fewer credits:		
University Park Campus—rate per credit	89.00	178.00
Commonwealth Campuses—rate per credit	69.00	178.00
Behrend College—rate per credit	76.00	178.00

**Enrollment Charge**—All entering students who plan to enroll for 12 or more credits are required to pay a nonrefundable enrollment charge of \$52 upon acceptance of an offer of admission.

**General Deposit**—All full-time undergraduate students are required to make a general deposit of \$50 at the time of admission. This deposit will serve to safeguard the property and equipment used by students in their course of study. It will be retained until a student withdraws or is graduated.

The deposit, less any charges for equipment damages, losses, and forfeitures, will be refunded early in the subsequent semester to the student who has withdrawn or been graduated. The

## TUITION, ROOM, BOARD, AND OTHER CHARGES

refund will be made by check and mailed to the student's home address. If at any time the balance of the deposit falls below the minimum amount of \$15, the deposit must be replenished.

*Credit by Examination*—A charge of \$15 per credit is made for credit by examination. For evaluation of credits completed elsewhere a charge of \$25 is made for those applying for admission and a charge of \$3 for those who are already matriculated.

*Student Activities*—Student activities charges are determined by elected representatives of the student body, together with a faculty representative.

*Certification and Verification Fee*—A charge of \$2.00 is made for each request for verification or certification of enrollment.

*Change of Schedule Charge*—Unless a change is necessitated by the University, a charge of \$6 is made for each change of schedule after the first five working days of a semester.

*Late Registration Charge*—Unless the delay is unavoidable, \$10 is charged a student who fails to register on the appointed day.

*Other Expenses*—Books and supplies must be secured by the student. These vary from approximately \$125 per semester, depending upon the program.

**TERMS OF PAYMENT**—Tuition and charges, including room and board, are due and payable in advance of each semester at the Office of the Bursar, 103 Shields Building, University Park, PA 16802. Registration for courses may not be completed until tuition and charges are paid.

Approximately six weeks in advance of each semester, the University will mail to each continuing and newly admitted student of record an estimated bill for tuition and, where applicable, residence hall charges. Payment by mail is encouraged before the established deadline. The receipt is returned to the student by mail and will permit registration for the designated number of credits. This receipt is likewise authorization to obtain, where applicable, the residence hall key and meal ticket. If checks tendered for payment of tuition and charges are not paid upon presentation to the maker's bank, the student will automatically incur the late payment fee of \$25, and the receipt previously mailed will be considered null and void.

Any student who does not fulfill payment of obligations by the deadline established may be charged the late payment fee of \$25. This charge for late payment also applies to unpaid student supplemental charges. Students whose accounts are delinquent for more than ten days are subject to suspension from the University.

The University reserves the right to withhold transcripts and services to any current or former student who has an unsatisfied financial obligation to the University.

**WITHDRAWALS AND REFUNDS**—In the event of withdrawal, charges for tuition will be refunded under the following policy:

Refund of 80 percent upon withdrawal before the end of the first week of the semester (seventh consecutive calendar day from the first day of classes) and a decrease of 10 percent for each week thereafter up to and including the eighth consecutive calendar week. No amount will be refunded for withdrawal after the eighth consecutive calendar week of the semester.

Students whose reduction in credits results in a change from full-time to part-time status will receive refunds for that status change depending on the week of the semester in which the change is made, in accordance with the above policies.

Any refund policy related to adjustments in room and board will be a part of the housing contract.

# MAJORS

## GENERAL DEGREE REQUIREMENTS

There are a number of areas in which a certain level of competence is expected of all recipients of associate degrees. Therefore, all associate degree programs of the University demand the satisfactory completion of the following requirements:

- 3 credits in the social sciences
- 3 credits in the arts and humanities
- 3 credits in English
- 3 credits in speech communication
- 6 credits in the physical sciences, biological science, or mathematics
- 3 credits in any of the above categories; to be determined by the department

RESERVATIONS—The University reserves the right to make such program or class changes as may become necessary because of insufficient enrollment or other contingencies. The University also reserves the right to make any necessary changes in tuition and charges without prior notice. Courses and programs described and listed in this bulletin are also subject to change without notice.

## AGRICULTURAL BUSINESS (2 AGB)

The Agricultural Business major prepares students for employment in commercial agriculture and businesses serving agriculture. Three options allow students to specialize in either crop or livestock production or in agricultural business, which provides training in management, business organization, and sales.

The first two semesters are offered at selected Commonwealth Campuses where students fulfill basic course requirements in accounting, business, English, and natural and social sciences. The second year at the University Park Campus provides course work in livestock and crop production, management, and agricultural business. As part of the requirements, there are supporting courses in agricultural engineering, farm management, agricultural marketing and sales. Each option allows the student a choice of electives to satisfy special interests and needs.

For the Associate in Science, 68 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 23 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015(3), SPCOM 100(3)	x	—
QUANTIFICATION AND NATURAL SCIENCES (8 credits)		
BIOL 101(4), 102(4)	x	—
ARTS AND HUMANITIES (3 credits)		
Selection from University list (3)	x	—
SOCIAL SCIENCES (3 credits)		
Selection from University list (3)	x	—
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 201(3) or select 3 credits in speaking or writing	x	—
<b>REQUIREMENTS FOR THE MAJOR: 45 credits</b>		
<b>COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 9 credits</b>		
PREScribed COURSES (9 credits)		
ACCTG 101(3), B LAW 243(3), CHEM 011(3)	x	—



*Scheduling Recommendation  
by Semester Standing*

1-2

3-4

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**REQUIREMENTS FOR THE OPTION: 36 credits**


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**ANIMAL PRODUCTION OPTION: 36 credits****PRESCRIBED COURSES (18 credits)**

AG E 214(3), AGRO 028(3), 200(3), AN SC 100(3),  
202(3), PTYSC 201(1), 202(2)

—

x

**ADDITIONAL COURSES (6 credits)**

AG EC 101, 106, or 208(3)

—

x

AN SC 007 or 201(3)

—

x

**SUPPORTING COURSES AND RELATED AREAS (9 credits)**

Select 6 credits in agricultural economics

—

x

Select 3 credits in agricultural engineering

—

x

**ELECTIVES (3 credits)**

—

x

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**CROP PRODUCTION OPTION: 36 credits**
**PRESCRIBED COURSES (18 credits)**

AG E 214(3), 322(3), AGRO 028(3), 200(3),  
AG EC 102(3), ENT 012(3)

—

x

**ADDITIONAL COURSE (3 credits)**

AG EC 101, 106, or 208(3)

—

x

**SUPPORTING COURSES AND RELATED AREAS (6 credits)**

Select 3 credits in animal science or poultry  
science

—

x

Select 3 credits in horticulture

—

x

**ELECTIVES (9 credits)**

—

x

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**GENERAL OPTION: 36 credits**
**PRESCRIBED COURSES (6 credits)**

AG EC 297(3), AGRO 200(3)

—

x

**ADDITIONAL COURSES (15 credits)**

AG EC 101 or 208(3); AG EC 102 or 232(3)

—

x

AG EC 106 or 200(3); AGRO 028 or PLTSC 200(3)

—

x

MGMT 100 or MKTG 220(3)

—

x

**SUPPORTING COURSES AND RELATED AREAS (12 credits)**

Select 3 credits in agriculture or business

—

x

Select 3 credits in agricultural engineering

—

x

Select 6 credits in animal or poultry science

—

x

**ELECTIVES (3 credits)**

## AIR POLLUTION CONTROL ENGINEERING TECHNOLOGY

This major prepares students for positions as air pollution control technicians, working for a local, state, or federal agency. Technicians may be responsible for the calibration, installation, and operation of air sampling and monitoring equipment, investigation of complaints, plant inspections, and source evaluation. As an industrial air pollution control technician, these same responsibilities may be required with the addition of evaluation and monitoring of gas cleaning equipment and performance.

To graduate, 71-72 credits are required.

This program is not currently being offered to entering students.



ARCHITECTURAL ENGINEERING  
TECHNOLOGY (2 AET)

This program is designed to provide technically trained personnel between the level of high school graduate and professional architectural engineer or architect to support the architectural design and construction industries. Architectural engineering technicians work under the supervision of a graduate architect or architectural engineer. They translate sketches and design concepts into working drawings and specifications. To do so, they need basic skills in structural and environmental systems design and layout, familiarity with site planning, knowledge of building materials and equipment characteristics and performance, as well as the training in drafting techniques required for the realization of final drawings and specifications. The graduates of this major are prepared for employment in architectural, building engineering, or industrialized housing firms.

Some graduates of this program continue their education by enrolling in the baccalaureate Building Construction Technology, Energy Technology, or Mechanical Design Engineering Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 69-70 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 23 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 004*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (8 credits)		
MATH 807(5), PHYS 150(3)	x	—
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 015(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 46-47 credits</b>		
PRESCRIBED COURSES (41 credits)		
A E 801(2), 802(2), 803(3), 804(3), CMPSC 101(3), E G 001(2), E MCH 811(3), MATH 808(4)	x	—
A E 806(2), 807(3), 810(3), 813(2), 814(3), 815(3), PHYS 151(3)	—	x
ADDITIONAL COURSES (5-6 credits)		
Select 5-6 credits from the following technical courses: A E 808, 812, 830, CHEM 011, C E 861, CMPSC 102, E E 800, E G 012, 803, 830, E MCH 813, I E 805, MATH 161, 162, 240, 250, M E 807, 881, S T 801, or 830	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

## BIOMEDICAL EQUIPMENT TECHNOLOGY (2 BET)

During the past several decades, the medical community has grown to depend increasingly on machines for the delivery of quality health care. Biomedical equipment technicians are men and women responsible for maintaining these machines in accurate and safe working order. Their tasks include functional and safety inspecting, preventive maintenance, calibration, troubleshooting, and repair of this equipment. In addition, they may be involved in equipment control programs, in electrical safety assurance programs, and in training hospital personnel in the safe and proper use of the equipment. The classroom and laboratory portions of this program focus on electronically-based patient monitoring equipment. The student is, however, exposed to a much broader spectrum of biomedical equipment through a ten-week practical internship in an approved health care facility.

Some graduates of this program continue their education by enrolling in the baccalaureate Electrical Design Engineering Technology program offered at Penn State's Capitol Campus. Graduation from this program further expands the choices of employment.

For the Associate in Engineering, 75 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4	Summer
<b>GENERAL DEGREE REQUIREMENTS: 23 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 004*(3)	x	—	—
SPCOM 100(3)	—	x	—
QUANTIFICATION AND NATURAL SCIENCES (8 credits)			
MATH 807(5), BIOL 041(3)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	x	—
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	x	—
GENERAL EDUCATION SELECTION (3 credits)			
ENGL 015(3)	x	—	—
<b>REQUIREMENTS FOR THE MAJOR: 52 credits</b>			
PRESCRIBED COURSES (49 credits)			
CMPSC 101(3), E E 801(4), 805(1), 809(1), 810(3), 814(3), 818(2), E G 001(2)	x	—	—
CHEM 011(3), MATH 808(4), PHYS 150(3), 151(3)	x	x	—
B E T 801(5), 802(5), 804(3)	—	x	—
B E T 803(4)	—	—	x
ADDITIONAL COURSE (3 credits)			
Select 3 credits from the following technical courses: B E T 830, BIOL 029, CH E 802, 831, C E 861, CMPSC 102, E E 811, 813, 817, 830, E G 803, E MCH 811, I E 315, MATH 161, 162, 240, or M E 807	—	x	—

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

BUSINESS ADMINISTRATION (2 B A)

This two-year, college-level academic program is designed to provide instruction in business administration that fulfills the requirements of various levels of responsibility higher than that held by high school graduates.

The primary objective of this major is to provide a managerially oriented program with sufficient communicative and mathematical skills, socially relevant course work, and advanced courses in specific business specialties to develop a well-rounded graduate.

For the Associate in Science, 68 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 004 or 015(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
MATH 005(3)	x	—
Select 3 credits in natural sciences	x	—
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 826(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 47 credits</b>		
PRESCRIBED COURSES (21 credits)		
ACCTG 801(3), 802(3), B LAW 243(3), CMPSC 803(3), FIN 100(3), MGMT 100(3), MKTG 221(3)	x	x
ADDITIONAL COURSES (24 credits)		
Q B A 101 or 801(3)	x	—
ECON 002, 004, or 014(3)	—	x
Select 18 credits from ACCTG 803, 806, 807, B LAW 850, B LOG 301, 304, 305, CMPSC 120, 140, 890, ECON 002, 004, FIN 108, 810, INS 102, 810, 820, 830, I B 862, L S 100, MGMT 801, 802, MKTG 220, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, Q B A 102, R EST 301, 810, or 830	—	x
SUPPORTING COURSES AND RELATED AREAS (2 credits)		
Select 2 credits in physical education	x	x

CHEMICAL ENGINEERING TECHNOLOGY (2CHET)

This major prepares students for positions as assistants to chemists, chemical engineers, and petroleum engineers, assistants in research and control laboratories, and trainees for future supervisory positions in manufacturing and production. Graduates of the major have a reasonable proficiency in basic sciences (chemistry, mathematics, and physics), communication skills, and the basic principles of chemical engineering technology.

Some graduates of this program continue their education by enrolling in the baccalaureate Energy Technology or Water Resources Engineering Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 71-72 credits are required.



*Scheduling Recommendation  
by Semester Standing*

1-2	3-4
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**GENERAL DEGREE REQUIREMENTS: 23 credits**

<b>COMMUNICATIONS (6 credits)</b>		
ENGL 004*(3)	x	—
SPCOM 100(3)	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (8 credits)</b>		
MATH 807(5), PHYS 150(3)	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
Select 3 credits in humanities	—	x
<b>SOCIAL SCIENCES (3 credits)</b>		
Select 3 credits in social sciences	—	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>		
ENGL 015(3)	x	—

**REQUIREMENTS FOR THE MAJOR: 48-49 credits**

<b>PRESCRIBED COURSES (43-44 credits)</b>		
CMPSC 101(3), E G 001(2), MATH 808(4)	x	—
CHEM 012(3-4), 013(3), 014(1), 015(1), 023(4), 034(3), PHYS 151(3)	x	x
CH E 810(4), 811(5), 821(2), 822(2), 830(3)	—	x
<b>ADDITIONAL COURSES (5 credits)</b>		
Select 5 credits from the following technical courses: BI SC 003, BIOL 011, 041, CH E 831, CHEM 035, CMPSC 102, E G 803, 830, E MCH 811, I E 315, 805, MATH 161, 162, 240, 250, METEO 303, or MICRB 006	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

## CLINICAL HEALTH SERVICES (2 CHS)

The goal of this program is to educate students to assist physicians in providing health care to patients in a primary-care setting.

The program is twenty-one months in length, with two semesters of work in the basic and clinical sciences, one semester (the summer session between the first and second academic year) of activity in the area of categorical clinical experiences, with the final two semesters being spent in a preceptorship in a primary-care environment. Upon completion of the program, the student may take the National Certification Examination for physician assistants.

Admission requirements include 60 undergraduate credits from a regionally approved college or university, or equivalent, including a 3-credit college-level course in each of the following: English composition, speech communication, humanities, anatomy and physiology, biology, mathematics, microbiology, sociology, and psychology.

For more information, write to The Milton S. Hershey Medical Center, 500 University Drive, Hershey, PA 17033.

For the Associate in Science in Clinical Health Services, 72 credits are required.



COMMUNITY SERVICES

				<i>Scheduling Recommendation by Semester Standing</i>		
				1-2	3-4	5-6
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>						
COMMUNICATIONS (6 credits)						
Students are admitted with advanced standing						
QUANTIFICATION AND NATURAL SCIENCES (6 credits)						
Students are admitted with advanced standing						
ARTS AND HUMANITIES (3 credits)						
Students are admitted with advanced standing						
SOCIAL SCIENCES (3 credits)						
Students are admitted with advanced standing						
GENERAL EDUCATION SELECTION (3 credits)						
Students are admitted with advanced standing						
<b>REQUIREMENTS FOR THE MAJOR: 72 credits</b>						
PRESCRIBED COURSES (72 credits)						
P A 800(7), 801(7), 805(1), 810(3), 820(3),						
821(3), 840(2), 841(2), 850(3), 870(1),						
871(1)						
				x	—	—
P A 878(9), 880(15)						
				—	x	—
P A 881(15)						
				—	—	x

COMMUNITY SERVICES (2ECSV)

The Community Services major is designed to provide entry-level professional competency in one of several human service fields. The objective of the major is to provide a general education background, a knowledge base in human development, and a core of professional skills in a particular human services area. Challenges, issues and problems, current approaches and procedures, and elements of program planning and services provision are studied. The major has three options.

The Administration of Justice option is designed to prepare persons for career roles in police departments, probation and parole agencies, and correctional institutions.

The Adult Development and Aging option is designed to prepare persons for a wide variety of service roles in boarding homes, nursing homes, area agencies on aging, senior citizen centers, and other sites which provide services for the elderly.

The Child and Youth Services option is designed to prepare persons for a wide variety of service roles in day and institutional child care agencies, preschools, head start centers, and other child and youth service settings.

The Community Services major includes one semester of field experience in a local community agency.

For the Associate in Science, 62 credits are required.

			<i>Scheduling Recommendation by Semester Standing</i>	
			1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>				
COMMUNICATIONS (6 credits)				
ENGL 015(3), SPCOM 100(3)				
			x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)				
Selections from University list (6)				
			x	—
ARTS AND HUMANITIES (3 credits)				
Selection from University list (3)				
			x	—

*Scheduling Recommendation  
by Semester Standing*

	1-2	3-4
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<b>SOCIAL SCIENCES (3 credits)</b>		
Selection from University list (3)	x	—
<b>GENERAL EDUCATION SELECTION (3 credits)</b>		
ENGL 201, 211, 218, or 219(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 41 credits</b>		
<b>COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 15 credits</b>		
<b>PRESCRIBED COURSES (7 credits)</b>		
H DEV 100(1), 101(3), 102(3)	x	—
<b>ADDITIONAL COURSES (8 credits)</b>		
ADM J 395* or H DEV 395*(8)	—	x
<b>REQUIREMENTS FOR THE OPTION: 26 credits</b>		
<b>ADMINISTRATION OF JUSTICE OPTION: 26 credits</b>		
<b>PRESCRIBED COURSES (11 credits)</b>		
ADM J 111(3)	x	—
ADM J 221(3), 240(1), 241(2), 394(1), 396(1)	—	x
<b>SUPPORTING COURSES AND RELATED AREAS (15 credits)</b>		
Select 15 credits of professional electives in consultation with adviser	—	x
<b>ADULT DEVELOPMENT AND AGING OPTION: 26 credits</b>		
<b>PRESCRIBED COURSES (14 credits)</b>		
I F S 349(3)	x	x
H DEV 395*(4), I F S 297(4), 315(3)	—	x
<b>ADDITIONAL COURSE (3 credits)</b>		
Select 3 credits from I F S 318, 319, or NUTR 251	—	x
<b>SUPPORTING COURSES AND RELATED AREAS (9 credits)</b>		
Select 9 credits of professional electives in adult development and aging in consultation with adviser	—	x
<b>CHILD AND YOUTH SERVICES OPTION: 26 credits</b>		
<b>PRESCRIBED COURSES (11 credits)</b>		
I F S 297(6), 330(1), 395*(4)	—	x
<b>ADDITIONAL COURSES (6 credits)</b>		
I F S 329 or 339(3)	x	—
I F S 315 or 319(3)	—	x
<b>SUPPORTING COURSES AND RELATED AREAS (9 credits)</b>		
Select 9 credits of professional electives in child services and child development in consultation with adviser	—	x

\*Guidelines for Field Placement include:

1. Agencies utilized are local agencies.
2. Priority for placement is made for students with higher semester standings.
3. Prerequisites for placement include for Administration of Justice — ADM J 111, H DEV 102; for Adult Development and Aging — H DEV 101, 349; for Child and Youth Services — H DEV 101; I F S 329 or 339.

## COMPUTER SCIENCE (2CPSC)

The primary objective of this program is to prepare graduates for immediate and continuing employability as application programmers, associate systems designers, or associate systems programmers.

To meet this objective the program is designed to ensure a thorough knowledge of the techniques of programming general-purpose digital computers, and includes extensive practice—using contemporary programming technologies—in the analysis, organization, validation, and documentation of effective computer code. The program also includes practical knowledge of the logical organization of modern digital computers and related peripheral equipment, the structure of operating systems and compilers, and considerations in the design of information systems.

The General Education Requirements provide the student with an extension to the basic educational foundation. The General Requirements for the Major give the graduate technical competence in the computing and data processing field. The Application Specialization provides a practical knowledge of an area of application within which the graduate may profitably utilize the acquired computing talent.

For the Associate in Science, 63 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
MATH 017(3), 018(3)	x	—
ARTS AND HUMANITIES (3 credits)	—	x
SOCIAL SCIENCES (3 credits)	—	x
GENERAL EDUCATION SELECTION (3 credits)		
Select 3 credits in Q B A or STAT	x	—
<b>REQUIREMENTS FOR THE MAJOR: 42 credits</b>		
PRESCRIBED COURSES (28 credits)		
CMPSC 100(3), 101(3), 102(3), 140(3), ENGL 218(3)	x	—
CMPSC 144(4), 154(3), 164(3), 805(3)	—	x
SUPPORTING COURSES AND RELATED AREAS (14 credits)		
Technical specialization and related work (12)	x	x
Select 2 credits in physical education	—	x

## DIETETIC FOOD SYSTEMS MANAGEMENT (2EDSM)

The purpose of this major is to prepare food systems management dietetic technicians for middle management positions in the food service area of health care facilities or community feeding operations. Candidates for admission to this major must be employed at least fifteen hours a week in a health care facility food service operation where their work is supervised by a registered dietitian. Graduates become eligible for technician membership in the American Dietetic Association.

Students who meet admission criteria are admitted to the extended degree major in Dietetic Food Systems Management. The required courses are available primarily through correspondence study offered by the Department of Independent Learning.

Students who achieve outstanding records may, upon completion of this major, apply for admission to the Management Dietetics option of the baccalaureate degree major in Hotel, Restaurant, and Institutional Management in the College of Human Development. Five additional semesters of satisfactory work are required to earn the baccalaureate degree.

For the Associate in Science, 68 credits are required.



*Scheduling Recommendation  
by Semester Standing*  
1-2                      3-4

**GENERAL DEGREE REQUIREMENTS: 21 credits**

COMMUNICATIONS (6 credits)		
ENGL 015(3), SPCOM 100(3)	x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
MATH 035, STAT 200, or CMPSC 101(3)	x	—
BIOL 041(3)	x	—
ARTS AND HUMANITIES (3 credits)		
SOCIAL SCIENCES (3 credits)		
SOC 001 or 003(3)	x	—
GENERAL EDUCATION SELECTION (3 credits)		
ECON 002, 004, or 014(3)	x	—

**REQUIREMENTS FOR THE MAJOR: 47 credits**

PRESCRIBED COURSES (32 credits)		
D S M 100(1), 103(3), 250(4), 260(4), 295(4), 304(3), HR&IM 225(3), H P A 101(3), H F S 802(3), NUTR 252(4)	x	x
ADDITIONAL COURSES (12 credits)		
ACCTG 101 or 801(3)	x	x
EDPSY 014 or 297(3)	x	x
D S M 205 or MGMT 321 or 341(3)	x	x
NUTR 251 or 801(3)	x	x
SUPPORTING COURSES AND RELATED AREAS (3 credits)		
Select 3 credits in consultation with the student's adviser to develop competence as a dietetic practitioner	x	x

**ELECTRICAL ENGINEERING TECHNOLOGY (2 EET)**

This major prepares graduates for technological service with manufacturers of electrical, electronic, and computer equipment; electrical utilities; and electrical maintenance and instrumentation departments of various industrial concerns. The principal objective is to provide a practical knowledge of electronic, digital, and microprocessor theory as well as electrical machinery and its application.

Some graduates of this program continue their education by enrolling in the baccalaureate Electrical Design Engineering Technology or Energy Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 73-74 credits are required.

*Scheduling Recommendation  
by Semester Standing*  
1-2                      3-4

**GENERAL DEGREE REQUIREMENTS: 23 credits**

COMMUNICATIONS (6 credits)		
ENGL 004*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (8 credits)		
MATH 807(5), PHYS 150(3)	x	—

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.



## FOREST TECHNOLOGY

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 015(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 50-51 credits</b>		
PREScribed COURSES (48 credits)		
CMPSC 101(3), E G 001(2), MATH 808(4), E E 801(4), 805(1), 809(1), 810(3), 814(3), 818(2)	x	—
E E 804(2), 806(1), 811(3), 813(3), 815(3), 816(3), 817(4), 819(1), 820(1), 821(1), PHYS 151(3)	—	x
ADDITIONAL COURSES (2-3 credits)		
Select 2-3 credits from the following technical courses: BI SC 003, CHEM 011, 012, C E 861, CMPSC 102, E E 830, E G 003, 803, 830, E MCH 813, I E 315, 805, MATH 161, 162, 240, M E 800, or 807	—	x

## FOREST TECHNOLOGY (2FORT)

The objectives of this major are to train students in the techniques that are basic to planning, organizing, and managing forestry enterprises and to provide a program of general studies which will serve as a foundation for future intellectual growth. It is intended that graduates will act in a supporting capacity to professional foresters.

For the Associate in Science, 68-70 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 015(3), SPCOM 100(3)	x	—	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)			
MATH 807(5)	x	—	—
FOR 821(1)	—	x	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	—	x
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	—	x
GENERAL EDUCATION SELECTION (3 credits)			
ENGL 826(3)	—	—	x
<b>REQUIREMENTS FOR THE MAJOR: 47-49 credits</b>			
PREScribed COURSES (41 credits)			
FOR 240(3), 250(3), 804(3), 824(1), 840(2), 806(3), 825(1), 841(4)	x	—	—
FOR 820(1), 822(1), 827(1)	—	x	—
ACCTG 016(3), FOR 220(3), 221(1), 241(4), 242(3), 809(3), 814(1)	—	—	x

*Scheduling Recommendation  
by Semester Standing*

	1-2	Summer	3-4
--	-----	--------	-----

**ADDITIONAL COURSES (6-8 credits)****Group I\***

Select 6 credits from FOR 807(3), 817(3), or  
WILDL 801(3)

	—	—	x
--	---	---	---

**Group II\*\***

FOR 828(1), 829(3), 830(3), 831(1)

	x	x	x
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\*Students whose interests are primarily in land management should schedule two courses from Group I.

\*\*Students with an interest in sawmilling should take all courses in Group II.

## HIGHWAY ENGINEERING TECHNOLOGY (2 HET)

This major prepares highway construction technicians to perform many of the planning and design tasks necessary in the construction of highways, railroads, bridges, and airports. In the planning stages of construction, a highway construction technician may be engaged in estimating costs, purchasing materials, preparing specifications, computing fills, cuts, and drainage requirements, drafting, designing, or surveying. During actual construction such technicians may perform supervisory functions and inspection.

Some graduates of this program continue their education by enrolling in the baccalaureate Building Construction Technology or Transportation Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 72 credits are required.

*Scheduling Recommendation  
by Semester Standing*

	1-2	3-4
--	-----	-----

**GENERAL DEGREE REQUIREMENTS: 23 credits****COMMUNICATIONS (6 credits)**

ENGL 004\*(3)

	x	—
--	---	---

SPCOM 100(3)

	—	x
--	---	---

**QUANTIFICATION AND NATURAL SCIENCES (8 credits)**

MATH 807(5), PHYS 150(3)

	x	—
--	---	---

**ARTS AND HUMANITIES (3 credits)**

Select 3 credits in arts or humanities

	—	x
--	---	---

**SOCIAL SCIENCES (3 credits)**

Select 3 credits in social sciences

	—	x
--	---	---

**GENERAL EDUCATION SELECTION (3 credits)**

ENGL 015(3)

	x	—
--	---	---

**REQUIREMENTS FOR THE MAJOR: 49 credits****PRESCRIBED COURSES (49 credits)**

C E 809(2), 811(3), 812(3), 818(2), CMPSC 101(3),

E G 001(2), ENGL 826(3), MATH 808(4)

	x	—
--	---	---

C E 814(3), 821(3), 822(3), 823(3), 824(3), 825(3),

E MCH 811(3), 813(3), PHYS 151(3)

	—	x
--	---	---

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015. Students who begin with ENGL 015 are encouraged to take ENGL 218. ENGL 826 is required for all students in the program.

HOTEL AND FOOD SERVICE (2 HFS)

This is an intensive four-semester major designed to prepare students for managerial positions in the hospitality industry. The course of study places heavy reliance on experience acquired in an on-the-job setting.

Students who achieve outstanding records may, upon completing this program, apply for admission to the baccalaureate degree program in Hotel, Restaurant, and Institutional Management in the College of Human Development. Six additional semesters of satisfactory work are required to earn the baccalaureate degree.

For the Associate in Science, 66 credits are required.

			<i>Scheduling Recommendation by Semester Standing</i>	
			1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>				
COMMUNICATIONS (6 credits)				
ENGL 015(3), SPCOM 100(3)	x			—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)				
Select 6 credits from University list (6)	x			—
ARTS AND HUMANITIES (3 credits)				
Select 3 credits from University list (3)	x			—
SOCIAL SCIENCES (3 credits)				
Select 3 credits in Economics	x			—
GENERAL EDUCATION SELECTION (3 credits)				
Select 3 credits from ENGL 201, 211, 218, or 219	x			—
<b>REQUIREMENTS FOR THE MAJOR: 45 credits</b>				
PRESCRIBED COURSES (22 credits)				
HR & IM 102(3)	x			—
HR & IM 225(3), 295(1), H F S 804(3), 850(4), 860(4), 870(4)	—			x
ADDITIONAL COURSE (3 credits)				
Select 3 credits in accounting	—			x
SUPPORTING COURSES AND RELATED AREAS (20 credits)				
Select 20 credits in consultation with adviser to develop a competency in management or general business administration				
	x			x

LABOR STUDIES (2ELBR)

The purpose of this program is to help employees improve their understanding and competence in coping with personal, group, and organizational problems at their worksites, in relationships with employers, and in transactions with the community, the economy, and the polity. The program consists of a core of labor courses supplemented by introductory liberal arts studies which provide (1) basic communication skills, (2) conceptual tools of analysis, and (3) a more general cultural context for the examination of labor problems.

For the Associate in Arts, 60 credits are required.

			<i>Scheduling Recommendation by Semester Standing</i>	
			1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>				
COMMUNICATIONS (6 credits)				
	x			—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)				
	x			—
ARTS AND HUMANITIES (3 credits)				
	x			—



	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
SOCIAL SCIENCES (3 credits)	x	—
GENERAL EDUCATION SELECTION (3 credits)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 39 credits</b>		
PREScribed COURSES (18 credits)		
L S 100(3), 102(3), 103(3), 104(3), 156(3), 296(3)	x	x
SUPPORTING COURSES AND RELATED AREAS (21 credits)		
Select 21 credits from the following areas in consultation with adviser: economics, history, industrial engineering, journalism, labor studies, management, political science, psychology, sociology	x	x

## LETTERS, ARTS, AND SCIENCES# (2 LAS)

The objectives of this program are to broaden the student's understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student's interests or career plans. This program is a complete two-year degree program. However, graduates who later seek admission to baccalaureate programs may apply baccalaureate credits toward the new degree. Any 800-level credits taken in the Letters, Arts, and Sciences program are not applicable toward most baccalaureate degrees.

For the Associate in Arts, 60 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015*(3), SPCOM 100(3)	x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
Select 3 credits in mathematics (MATH 004 not acceptable), statistics, computer science, or philosophy (PHIL 012 and 212 only) +	x	x
Select 3 credits in any courses designated as physical, biological, or earth sciences +	x	x
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in any courses designated as arts +	x	x

#The 45 required and related credits must be baccalaureate-level courses. For those intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a Bachelor of Arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken since admission to a Bachelor of Arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

\*Students will be placed in ENGL 004, 015, or 030 on the basis of English Placement Test scores. If a student is placed in ENGL 030, successful completion of that course will satisfy the English requirement.

+ Courses which will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the College of the Liberal Arts Associate Dean for Undergraduate Studies at the University Park Campus or from any Letters, Arts, and Sciences representative at the Commonwealth Campuses.



MASS COMMUNICATIONS—BROADCASTING

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<hr/>		
SOCIAL SCIENCES (3 credits)		
Select 3 credits in any courses designated as social and behavioral sciences +	x	x
<hr/>		
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 201, 211, 218, or 219(3)	x	x
<hr/>		
REQUIREMENTS FOR THE MAJOR: 39 credits		
<hr/>		
PREScribed COURSES (None)		
<hr/>		
SUPPORTING COURSES AND RELATED AREAS (24 credits)		
Select 3 credits in any courses designated as arts +	x	x
Select 6 credits in any courses designated as humanities +	x	x
Select 3 credits in any courses designated as social and behavioral sciences +	x	x
Select 3 credits in any courses designated as physical, biological, or earth sciences +	x	x
Select 9 credits in any one of the following areas: + arts, humanities, social and behavioral sciences, natural sciences, quantification, and foreign language skills. (If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.)	x	x
<hr/>		
ELECTIVES (15 credits)	x	x

+ Courses which will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Science checksheet, which may be obtained from the College of the Liberal Arts Associate Dean for Undergraduate Studies at the University Park Campus or from any Letters, Arts, and Sciences representative at the Commonwealth Campuses.

MASS COMMUNICATIONS—BROADCASTING

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to broadcasting.

To graduate, 61-63 credits are required.

This program is not currently being offered to entering students.

MASS COMMUNICATIONS—JOURNALISM

The objectives of this program are to broaden students' understanding of, and interest in, vocational aspects of mass communications through a combination of courses in liberal and applied education and to develop their skill in various aspects of mass communications in order to prepare them for work in areas related to journalism.

This program is not currently being offered to entering students.

# MECHANICAL ENGINEERING TECHNOLOGY (2 MET)

This major is intended to prepare detail or layout draftsmen and junior designers for manufacturing industries as well as for the many concerns engaged in installation or erection work. The principal objective is to prepare young men and women for employment in machine design, tool and die design, or structural layout. Some graduates are involved in technical or industrial sales, become supervisors in light and heavy industry, or enter management trainee programs.

Some graduates of this program continue their education by enrolling in the baccalaureate Building Construction Technology, Mechanical Design Engineering Technology, Transportation Technology, or Water Resources Engineering Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 70-71 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>GENERAL DEGREE REQUIREMENTS: 23 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 004*(3)	x	—	—
SPCOM 100(3)	—	—	x
QUANTIFICATION AND NATURAL SCIENCES (8 credits)			
MATH 807(5), PHYS 150(3)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	—	x
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	—	x
GENERAL EDUCATION SELECTION (3 credits)			
ENGL 015(3)	x	—	—
<b>REQUIREMENTS FOR THE MAJOR: 47-48 credits</b>			
PRESCRIBED COURSES (42 credits)			
CMPSC 101(3), E G 001(2), 012(2), E MCH 811(3), I E 811(3), MATH 808(4)			
I E 812(3)	x	—	—
A E 809(3), E G 803(3), E MCH 813(3), 814(1), I E 815(3), M E 805(3), 810(3), PHYS 151(3)	—	x¶	—
ADDITIONAL COURSES (5-6 credits)	—	—	x
Select 5-6 credits from the following technical courses: A E 808, BI SC 003, CHEM 011, 012, C E 861, E E 800, E G 003, 830, E MCH 812, I E 315, 805, MATH 161, 162, 240, 250, M E 807, or 830			
	—	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

¶To be taken at a regional campus.

# MEDICAL LABORATORY TECHNOLOGY (2 MLT)

This two-calendar-year program (four semesters, two summer sessions) is designed to provide the necessary general and technical training for hospital personnel between the level of the medical laboratory technician (certificate program) and the medical technologist (baccalaureate program). The course of study includes one year of intensive clinical experience at an affiliated hospital and the theoretical background necessary for the clinical procedures performed by the certified medical laboratory technician (associate degree program). Upon completion of pro-

## METALLURGICAL ENGINEERING TECHNOLOGY

gram requirements, the student receives the associate degree and is eligible to sit for examinations leading to certification and registry as a medical laboratory technician.

The program begins in the summer session.

For the Associate in Science, 71-72 credits are required.

### *Scheduling Recommendation by Semester Standing*

Summer      1-2      3-4

#### GENERAL DEGREE REQUIREMENTS: 21 credits

COMMUNICATIONS (6 credits)			
ENGL 015(3), SPCOM 100(3)	x	—	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)			
MATH 004 or 005(3)	x	—	—
BIOL 041(3)	—	x	x
ARTS AND HUMANITIES (3 credits)			
Selection from University list (3)	x	—	—
SOCIAL SCIENCES (3 credits)			
Selection from University list (3)	x	x	—
GENERAL EDUCATION SELECTION (3 credits)			
Select 3 credits in social and behavioral sciences from University list	x	x	—

#### REQUIREMENTS FOR THE MAJOR: 50-51 credits

PREScribed COURSES (50-51 credits)			
MICRB 150(4)	x	—	—
CHEM 012(3-4), 014(1), 034(3), BIOL 029(4), 042(1), CMPSC 001(1), MICRB 201(3), 202(2)	—	x	—
MICRB 151A(9), 151B(6), 151C(6), 151D(5), 151E(2)	—	—	x

## METALLURGICAL ENGINEERING TECHNOLOGY (2METE)

This program prepares students for positions in the metallurgical and metals-oriented industries as technical personnel in research laboratories and in quality control, and as supervisors of service groups and of production operations.

For the Associate in Engineering, 72 credits are required.

### *Scheduling Recommendation by Semester Standing*

1-2      3-4

#### GENERAL DEGREE REQUIREMENTS: 23 credits

COMMUNICATIONS (6 credits)		
ENGL 004 or 015(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (8 credits)		
MATH 807(5), CHEM 011(3)	x	—
ARTS AND HUMANITIES (3 credits)		
Selection from University list (3)	—	x
SOCIAL SCIENCES (3 credits)		
Selection from University list (3)	—	x
GENERAL EDUCATION SELECTION (3 credits)		
Select 3 credits in Economics	—	x

*Scheduling Recommendation  
by Semester Standing*  
1-2                      3-4

**REQUIREMENTS FOR THE MAJOR: 49 credits****PRESCRIBED COURSES (43 credits)**

CHEM 012(3), 014(1), E G 001(2), MATH 808(4),  
MET E 800(4), PHYS 150(3), 151(3)

x                      —

CMPSC 101(3), E E 800(2), I E 809(3), MET E 801(2),  
802(3), 803(3), 804(3), 805(3), 807(1)

—                      x

**ADDITIONAL COURSES (6 credits)**

ENGL 201 or 826(3)

x                      —

I E 812 or MET E 806(3)

x                      —

**MINING TECHNOLOGY (2MNGT)**

For the Associate in Science, 72 credits are required.

*Scheduling Recommendation  
by Semester Standing*  
1-2                      3-4

**GENERAL DEGREE REQUIREMENTS: 23 credits****COMMUNICATIONS (6 credits)**

ENGL 015(3)

x                      —

SPCOM 100(3)

—                      x

**QUANTIFICATION AND NATURAL SCIENCES (8 credits)**

MATH 807(5), CHEM 011(3)

x                      —

**ARTS AND HUMANITIES (3 credits)**

Selection from University list (3)

—                      x

**SOCIAL SCIENCES (3 credits)**

ECON 014(3)

x                      —

**GENERAL EDUCATION SELECTION (3 credits)**

GEOSC 001 or 020(3)

x                      —

**REQUIREMENTS FOR THE MAJOR: 49 credits****COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 25 credits****PRESCRIBED COURSES (25 credits)**

CMPSC 101(3), E G 001(2), E MCH 811(3), MATH 808(4),  
PHYS 150(3)

x                      —

MNG T 800(1), 804(3), 806(3)

x                      x

ENGL 826(3)

—                      x

**REQUIREMENTS FOR THE OPTION: 24 credits****MAINTENANCE OPTION: 24 credits****PRESCRIBED COURSES (24 credits)**

MGMT 800(3), MNG T 801(3), 802(3), 807(3), 808(3),  
809(3), 810(3), 811(3)

—                      x

**PRODUCTION OPTION: 24 credits****PRESCRIBED COURSES (21 credits)**

MN PR 061(3), MNG 023(3), 030(3), MNG T 801(3),  
802(3), 803(3), 805(3)

—                      x



NUCLEAR ENGINEERING TECHNOLOGY

Scheduling Recommendation  
by Semester Standing  
1-2                      3-4

SUPPORTING COURSES AND RELATED AREAS (3 credits)		
Select 3 credits in mining technology	—	x
<hr/>		
SURFACE MINING OPTION: 24 credits		
PRESCRIBED COURSES (21 credits)		
MN PR 061(3), MNG 023(3), MNG T 815(3), 816(3), 817(3), 818(3), 819(3)	—	x
SUPPORTING COURSES AND RELATED AREAS (3 credits)		
Select 3 credits in mining technology	—	x

NUCLEAR ENGINEERING TECHNOLOGY (2 NET)

This major is designed to provide technically trained personnel to support the rapidly developing nuclear industry. The wide scope of training prepares the nuclear technician for careers in radiation safety, reactor operations, radioisotope handling, nuclear and control instrumentation, fuel fabrication, and health physics. A nuclear technician may work as a radiological safety specialist, engineering aide, or enter training as a reactor operator at a nuclear facility.

Some graduates of this program continue their education by enrolling in the baccalaureate Electrical Design Engineering Technology or Energy Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Nuclear Engineering Technology, 73 credits are required.

Scheduling Recommendation  
by Semester Standing  
1-2                      3-4

<hr/>		
GENERAL DEGREE REQUIREMENTS: 23 credits		
COMMUNICATIONS (6 credits)		
ENGL 004*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (8 credits)		
MATH 807(5)	x	—
CHEM 011(3)	—	x
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 015(3)	x	—
<hr/>		
REQUIREMENTS FOR THE MAJOR: 50 credits		
PRESCRIBED COURSES (50 credits)		
CMPSC 101(3), ENGL 826(3), E E 801(4), 809(1), 814(3), E G 001(2), MATH 808(4), PHYS 150(3), 151(3)	x	x
M E 807(3), NUC E 801(2), 802(4), 805(3)	—	x
NUC E 803(3), 804(3), 812(3), 814(3)	—	x†

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015. Students who begin with ENGL 015 are encouraged to take ENGL 218. ENGL 826 is required for students in the program.

†To be taken at University Park Campus.

## PHYSICAL THERAPIST ASSISTANCE (2 PTA)

The Physical Therapist Assistance program is designed to provide an opportunity for interested students to develop knowledge and skills in the principles of physical therapy techniques, appropriate use of equipment associated with various physical therapy treatment modalities, and the basic diagnostic approaches necessary for adequate rehabilitation programming efforts. In order to accomplish these tasks, the program utilizes a combination of basic science and nonscience course work coupled with appropriate clinical experiences.

To enter the program, students must have a high school diploma and satisfactory Scholastic Aptitude Test scores. The size of each entering class must be limited to ten students so that optimal clinical experiences and practical application situations can be maintained. Close, personal supervision is essential for total program integrity.

For the Associate in Science, 65 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4	5
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 004 or 015(3)	x	—	—
SPCOM 100A(3)	—	x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)			
MATH 017(3), BI SC 001(3)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in humanities	—	x	—
SOCIAL SCIENCES (3 credits)			
SOC 001(3)	—	x	—
GENERAL EDUCATION SELECTION (3 credits)			
ENGL 015, 201, or 218(3)	x	x	—
<b>REQUIREMENTS FOR THE MAJOR: 44 credits</b>			
PRESCRIBED COURSES (43 credits)			
BIOL 029(4), HL ED 800(3), 807(1), PH SC 007(3), PSY 002(3)	x	—	—
BIOL 041(3), 042(1), HL ED 384(3), 801(4), 803(3), 804(3)	—	x	—
HL ED 805(2), 806(10)	—	—	x
SUPPORTING COURSES AND RELATED AREAS (1 credit)			
Select 1 credit in HL ED or PH ED	x	—	—

## RAILWAY ENGINEERING TECHNOLOGY (2 RET)

The objective of this program is to prepare railway technicians for the revitalized railway industry. Such individuals will be able to run surveys, solve right-of-way and drainage problems, deal with track layout and maintenance problems, and work with basic railway structures. Graduates of the Railway Engineering Technology program may find employment as track foremen, track supervisors, track inspectors, or management trainees with the American railroads; as track inspectors with the Federal Railroad Administration; or as designers and estimators with consulting engineers.

Some graduates of this program continue their education by enrolling in the Building Construction Technology or Transportation Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 71-72 credits are required.

RETAILING

<i>Scheduling Recommendation by Semester Standing</i>			
	1-2	Summer	3-4
<b>GENERAL DEGREE REQUIREMENTS: 23 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 004*(3)	x	—	—
SPCOM 100(3)	—	—	x
QUANTIFICATION AND NATURAL SCIENCES (8 credits)			
MATH 807(5), PHYS 150(3)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	—	x
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	—	x
GENERAL EDUCATION SELECTION (3 credits)			
ENGL 015(3)	x	—	—
<b>REQUIREMENTS FOR THE MAJOR: 48-49 credits</b>			
PRESCRIBED COURSES (46 credits)			
C E 809(2), 811(3), 812(3), 818(2), MATH 808(4), CMPSC 101(3), E G 001(2), PHYS 151(3)	x	—	x
C E 813(4)	—	x	—
C E 840(3), 841(3), 842(3), 843(3), E E 800(2), E MCH 811(3), 813(3)	—	—	x
ADDITIONAL COURSES (2-3 credits)			
Select 2-3 credits from the following technical courses: C E 822, 823, 824, 825, 830, 861, CHEM 011, 012, CMPSC 102, E E 800, E G 803, 830, I E 315, 805, MATH 161, 162, 240, M E 800, or 807	—	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

RETAILING

This major, which trains for positions in retail stores, provides a minimum foundation of a general education, a basis for understanding customer wants and needs, and a technical knowledge of retail procedures. It includes one semester of supervised store experience. The major constitutes a well-balanced program for individual growth and development as well as for specialized employment training. To graduate, 66 credits are required.

This program is not currently being offered to entering students.

SCIENCE (2 SC)

This major is primarily designed to provide for the basic educational needs of students who desire to pursue professional programs as outlined by medical accrediting societies. The program provides a fundamental group of science courses of value to those who seek positions in government or industry where such knowledge is necessary or desirable.

For the Associate in Science, 64 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits) ENGL 015(3), SPCOM 100(3)	x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits) MATH 007(3), CHEM 011(3)	—	x
ARTS AND HUMANITIES (3 credits)	x	x
SOCIAL SCIENCES (3 credits)	x	x
GENERAL EDUCATION SELECTION (3 credits) Select 3 credits in social and behavioral sciences	x	x
<b>REQUIREMENTS FOR THE MAJOR: 43 credits</b>		
PRESCRIBED COURSES (25 credits) BIOL 029(3), 101(3), MATH 120(4), PHYS 150(3) BIOL 41(3), CMPSC 101(3), MICRB 106(2), 107(1), PHYS 151(3)	x  —	—  x
ADDITIONAL COURSES (15 credits) CHEM 034 or BIOCH 001(3) Select 12 credits from the following biological, mathematical, and physical science courses: ASTRO 001(3), BIOL 33(3), 42(1), 102(4), BI SC 003(3), CHEM 035(3), 102(3), MATH 121(4), PHIL 212(3), PHYS 297(3), or STAT 200(4)	—   x	x   x
SUPPORTING COURSES AND RELATED AREAS (3 credits) Select 3 credits from arts and humanities	x	x

SCIENCE

Radiologic Technologist Radiographer Option

This option is a twenty-seven-month program and requires seven semesters (five semesters plus two summer sessions).

For graduation, 66 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>			
	1-2	3-4	5-6	7
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>				
COMMUNICATIONS (6 credits) ENGL 015(3) SPCOM 100(3)	x —	— x	— —	— —
QUANTIFICATION AND NATURAL SCIENCES (6 credits) MATH 005(3), CHEM 011(3)	x	—	—	—
ARTS AND HUMANITIES (3 credits) Select 3 credits in arts or humanities	—	x	—	—
SOCIAL SCIENCES (3 credits) Select 3 credits in social sciences	x	x	—	—
GENERAL EDUCATION SELECTION (3 credits) Select 3 credits in social and behavioral sciences	x	x	—	—



<i>Scheduling Recommendation by Semester Standing</i>			
1-2	3-4	5-6	7

**REQUIREMENTS FOR THE OPTION: 45 credits**

<b>PRESCRIBED COURSES (45 credits)</b>			
BIOL 029(4), 101(4), HUMAN 101(3), MATH 006(3), PHYS 150(3)	x	—	—
BIOL 033(3), 041(3), CMPSC 100(3), PHYS 151(3), 297(3), R T R 1(1), 20(1), 30(1)	—	x	—
R T R 40(5), 50(1), 60(1)	—	—	x
R T R 70(1), 80(1), 90(1)	—	—	x

**SOCIOLOGY (2ESOC)**

This major introduces students to the study of human groups and their relationships to each other and to the environment. It enables students to gain some proficiency in the scientific study of group structures and processes. A further objective is to help students become more skillful in working with community institutions, agencies, and organizations either through gainful employment or as a volunteer.

For the Associate in Arts, 60 credits are required.

<i>Scheduling Recommendation by Semester Standing</i>	
1-2	3-4

**GENERAL DEGREE REQUIREMENTS: 21 credits**

<b>COMMUNICATIONS (6 credits)</b>	
ENGL 015(3), SPCOM 100(3)	x —
<b>QUANTIFICATION AND NATURAL SCIENCES (6 credits)</b>	
	x x
<b>ARTS AND HUMANITIES (3 credits)</b>	
	x x
<b>SOCIAL SCIENCES (3 credits)</b> (Not to include Sociology)	
	x x
<b>GENERAL EDUCATION SELECTION (3 credits)</b> Select 3 credits in any of the areas above to be determined by the department	
	x x

**REQUIREMENTS FOR THE MAJOR: 39 credits**

<b>PRESCRIBED COURSES (6 credits)</b>	
SOC 001(3)	x —
SOC 007(3)	— x
<b>ADDITIONAL COURSES (21 credits)</b> Select 12 credits from SOC 003, 005, 012, 013, 015, 023, 030, 047, or 055	
	x x
<b>SUPPORTING COURSES AND RELATED AREAS (12 credits)</b> Select 12 credits in arts, humanities, social and behavioral sciences	
	x x
<b>ELECTIVES (9 credits)</b>	
	x x

## SOLAR HEATING AND COOLING TECHNOLOGY (2SOLR)

This major is designed to prepare solar technicians for the expanding solar and related industries. They will be prepared to help design, specify, test, and supervise installation, and make cost estimates for residential and commercial solar energy-assisted heating and cooling systems involving the use of recognized standard components.

Some graduates of this program continue their education by enrolling in the baccalaureate Building Construction Technology or Energy Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 71 credits are required.

### *Scheduling Recommendation by Semester Standing*

	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 23 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 004*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (8 credits)		
MATH 807(5), PHYS 150(3)	x	—
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 015(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 48 credits</b>		
PRESCRIBED COURSES (42 credits)		
A E 801(2), 802(2), CMPSC 101(3), E E 800(2), E G 001(2), MATH 808(4), M E 881(4), S T 801(2)	x	—
A E 803(3), 804(3), PHYS 151(3), S T 804(3), 807(3), 808(3), 809(3)	—	x
ADDITIONAL COURSES (6 credits)		
Select 6 credits from the following technical courses: A E 807, 809, 810, 814, 815, 830, CMPSC 102, CHEM 011, 012, E G 803, 830, E MCH 811, 812, 813, MATH 161, 162, 240, 250, S T 806, or 830	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

## SURVEYING TECHNOLOGY (2 SRT)

The objectives of the major are to provide a knowledge of the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys, and to develop trained personnel who understand the relation between the precision of measurements and the interpretation of data in addition to having an appreciation of the skills and equipment needed to make precise measurements in the field of surveying.

Some graduates of this program continue their education by enrolling in the baccalaureate Building Construction Technology or Transportation Technology programs offered at Penn

# TELECOMMUNICATIONS TECHNOLOGY

State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 72-73 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>GENERAL DEGREE REQUIREMENTS: 23 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 004*(3)	x	—	—
SPCOM 100(3)	—	—	x
QUANTIFICATION AND NATURAL SCIENCES (8 credits)			
MATH 807(5), PHYS 150(3)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	—	x
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	—	x
GENERAL EDUCATION SELECTION (3 credits)			
ENGL 015(3)	x	—	—
<b>REQUIREMENTS FOR THE MAJOR: 49-50 credits</b>			
PRESCRIBED COURSES (47 credits)			
C E 809(2), 811(3), 812(3), 818(2), CMPSC 101(3), E G 001(2), ENGL 826(3)	x	—	—
MATH 808(4), PHYS 151(3)	x	—	x
C E 813(4)	—	x	—
C E 810(3), 814(3), 815(3), 816(3), 817(2), 890(2), E G 012(2)	—	—	x
ADDITIONAL COURSES (2-3 credits)			
Select 2-3 credits from the following technical courses: C E 822, 823, 824, 825, 830, 840, 841, 861, CHEM 011, 012, CMPSC 102, E E 800, E G 003, 803, 830, E MCH 813, I E 315, 805, MATH 161, 162, 240, or M E 800	—	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 must take ENGL 015. Students who begin with ENGL 015 are encouraged to take ENGL 218. ENGL 826 is required for all students in the program.

## TELECOMMUNICATIONS TECHNOLOGY (2TELT)

The field of telecommunications includes the transmission of voice and digital signals by telephone, telegraph, radio, television, and satellite. Graduates of this major will be engineering technicians who help select, design, install, operate, maintain, troubleshoot, and repair modern telecommunications systems. Future uses for telecommunications systems include electronic mail, electronic shopping, home computer terminal tie-ins, remote utility meter reading, and the transmission of biomedical data between hospitals, libraries, and doctors' offices.

Some graduates of this program continue their education by enrolling in the Electrical Design Engineering Technology program offered at Penn State's Capitol Campus. Graduation from this program further expands the choices of employment.

For the Associate in Engineering, 73 credits are required.

*Scheduling Recommendation  
by Semester Standing*

1-2                      3-4

**GENERAL DEGREE REQUIREMENTS: 23 credits**

<b>COMMUNICATIONS (6 credits)</b>		
ENGL 004*(3)	x	—
SPCOM 100(3)	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (8 credits)</b>		
MATH 807(5), PHYS 150(3)	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
Select 3 credits in arts or humanities	—	x
<b>SOCIAL SCIENCES (3 credits)</b>		
Select 3 credits in social sciences	—	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>		
ENGL 015(3)	x	—

**REQUIREMENTS FOR THE MAJOR: 50 credits**

<b>PRESCRIBED COURSES (50 credits)</b>		
CMPSC 101(3), E E 801(4), 805(1), 809(1), 810(3), 814(3), 818(2), E G 001(2), MATH 808(4), TELCM 840(1)	x	—
E E 804(2), 806(1), 811(3), 816(3), 817(4), 820(1), 821(1), PHYS 151(3), TELCM 841(3), 842(1), 843(3), 844(1)	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

**WILDLIFE TECHNOLOGY (WILDL)**

This program will prepare a student in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and the care, maintenance, and propagation of animals. Graduates should be able to support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research.

For the Associate in Science, 65-69 credits are required.

*Scheduling Recommendation  
by Semester Standing*

1-2              Summer              3-4

**GENERAL DEGREE REQUIREMENTS: 21 credits**

<b>COMMUNICATIONS (6 credits)</b>			
ENGL 004 or 015(3)	x	—	—
SPCOM 100(3)	—	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (6 credits)</b>			
MATH 807(5)	x	—	—
Select 3 credits in quantification or natural sciences	—	—	x
<b>ARTS AND HUMANITIES (3 credits)</b>			
Select 3 credits in arts or humanities	x	—	—
<b>SOCIAL SCIENCES (3 credits)</b>			
Select 3 credits in social sciences	—	—	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>			
ENGL 826(3)	—	—	x



	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>REQUIREMENTS FOR THE MAJOR: 44-48 credits</b>			
<b>PRESCRIBED COURSES (43 credits)</b>			
C E 809(2), FOR 203(2), 240(3), WILDL 801(3), 802(3), 803(3)	x	—	—
WILDL 805(3), 806(2)	—	x	—
FOR 242(3), WILDL 804(3), 807(3), 808(3), 809(3), 811(4), 813(3)	—	—	x
<b>ADDITIONAL COURSES (1-5 credits)</b>			
Select 1-5 credits from biology, biological sciences, bioscience, computer science, geography, geosciences, health education, WILDL 296, 297, or other fields in consultation with program leader	x	—	x

# COURSE DESCRIPTIONS

## CREDITS AND HOURS

Credits are awarded on the semester-hour basis. According to Senate Policy 42-23, a total of at least forty hours of work planned and arranged by the University faculty is required for the average student to gain 1 credit. While the distribution of time varies from course to course, generally, one-third of the time is devoted to formal instruction, such as lecture, recitation, laboratory, field trips, etc., and two-thirds of the time to outside preparation.

Credits, classroom work, and practicum or laboratory work are indicated by three numbers in parentheses immediately following the course title—for example (3:3:0):

1. The first number shows the maximum credits authorized for the course.
2. The second number shows the periods of classroom work (including lecture, recitation, class discussion, demonstration, or various combinations of these).
3. The third number shows the periods of practicum work (including laboratory, shop work, studio, drafting room, field trips, etc.).

A typical period is fifty minutes.

Courses numbered from 800 to 899 are reserved for the associate degree majors. Credit received for 800-series courses may be applicable to a particular baccalaureate degree program offered by the University at the discretion of the appropriate college and major department. Courses numbered from 1 to 399 carry baccalaureate credit and are required in most of the associate degree majors. Elective credit courses vary from campus to campus and semester to semester, and all of the courses listed below are not offered at each campus. Students may obtain information about the specific course offerings for a given campus from the appropriate *Schedule of Classes*.

## ACCOUNTING (ACCTG)

16. **INTRODUCTORY ACCOUNTING SURVEY (3:3:0)** Accounting for proprietorships, partnerships, and corporations for retailers and manufacturers; financial statement analysis. Students who have passed Acctg. 101 may not schedule this course.

101. **INTRODUCTORY FINANCIAL ACCOUNTING (3:2½:1)** Fundamentals of the collection, recording, summarization, and interpretation of accounting data.

104. **INTRODUCTORY MANAGERIAL ACCOUNTING (3:2½:1)** Actual and standard cost systems; managerial uses of cost data. Prerequisite: Acctg. 101.

801. **INTRODUCTORY ACCOUNTING (3:2:1)**

802. **INTRODUCTORY ACCOUNTING (3:2:1)** Prerequisite: Acctg. 801.

803. **INTERMEDIATE ACCOUNTING (3:3:0)** Financial accounting statements, concepts, and procedures; assets, liabilities, owners' equity, statement analysis. Prerequisite: Acctg. 802.

806. **FEDERAL TAX ACCOUNTING (3:3:0)** Federal tax revenue system as it affects the individual and business; tax planning, research, and preparation of returns. Prerequisite: Acctg. 802.

807. **MANAGERIAL ACCOUNTING (3:3:0)** Cost and budgetary control; preparation of information for decision making. Prerequisite: Acctg. 802.

816. **INTRODUCTORY ACCOUNTING SURVEY (3:3:0)** Fundamentals of accumulation and summarization of accounting data; emphasis on financial statement analysis and the uses of accounting in business.

## ADMINISTRATION OF JUSTICE (ADM J)

111. **INTRODUCTION TO THE AMERICAN CRIMINAL JUSTICE SYSTEM (3:3:0)** Criminal justice system including formulation of laws, extent of crime, processing and correction of offenders, victims.

221. **ISSUES IN THE AMERICAN CRIMINAL JUSTICE SYSTEM (3:3:0)** Examination of the models of the criminal process, functions of the justice system, and approaches to crime and punishment. Prerequisite: Adm.J. 111.

## AGRICULTURAL ECONOMICS

240. FIELD RESEARCH IN THE ADMINISTRATION OF JUSTICE (1:1:0) Field research strategies appropriate to the investigation of research questions in the administration of justice. Prerequisite: Adm.J. 111.

394. INTRODUCTION TO FIELD WORK IN ADMINISTRATION OF JUSTICE (1:1:0) Planning and preparation for field experience in an administration of justice agency setting. Prerequisites: Adm.J. 221, 240.

395. FIELD WORK IN ADMINISTRATION OF JUSTICE (13:0:26) Field experience focusing on the student's major interest within the administration of justice. Prerequisite: Adm.J. 394.

396. POST FIELD WORK SEMINAR IN ADMINISTRATION OF JUSTICE (1:1:0) Examination of concepts, critical issues, processes, and procedures which are useful in explaining and understanding the field internship experience. Prerequisite: Adm.J. 395.

## AGRICULTURAL ECONOMICS (AG EC)

101. INTRODUCTION TO AGRICULTURAL ECONOMICS (3:3:0) Application of economic principles to resource allocation problems in the production, marketing, and consumption of food and agricultural products. Not open to students in Agricultural Economics and Rural Sociology or Agricultural Business.

102. INTRODUCTION TO FOOD AND AGRICULTURAL MARKETING (3:3:0) Comprehensive theoretical and descriptive survey of farm and food products marketing from the perspective of producers, marketing middlemen, and consumers.

106. INTRODUCTION TO FARM MANAGEMENT (3:3:0) Organizing and operating farm businesses for financial success; measuring profits; improving efficiency of labor, land, capital; getting started in farming.

## AMERICAN STUDIES (AM ST)

100. INTRODUCTION TO AMERICAN STUDIES (3:3:0) A study of selected attempts to identify and interpret movements and patterns in American culture. Prerequisite: third-semester standing.

105. AMERICAN POPULAR CULTURE AND FOLKLIFE (3:3:0) Survey of popular culture, folklife, and ethnicity, synthesizing material from such areas as literature, media, entertainment, print, music, and film.

## ANTHROPOLOGY (ANTHY)

1. INTRODUCTORY ANTHROPOLOGY (3:3:0) Prehistoric and primitive people and cultures; primitive customs and institutions compared with those of modern man.

45. CULTURAL ANTHROPOLOGY (3:3:0) Beginnings of human culture; primitive economic life, society, government, religion, and art; cultural background of personality development.

## ARCHITECTURAL ENGINEERING TECHNOLOGY (A E)

801. BUILDING MATERIALS (2:2:0) Structural and architectural use of building materials and construction assemblies.

802. METHODS OF CONSTRUCTION (2:0:4) Materials and methods of construction used in buildings, as expressed in drawings. Prerequisite or concurrent: A.E. 801, E.G. 1.

803. PLUMBING AND FIRE PROTECTION (3:2:2) Layout of plumbing and fire protection in buildings to meet code and usage requirements. Prerequisite or concurrent: A.E. 802.

804. HEATING, VENTILATING, AND AIR CONDITIONING LAYOUT (3:2:2) Fundamental calculations and layout of systems in buildings. Prerequisite or concurrent: A.E. 802.

806. ARCHITECTURAL PRESENTATION (2:1:2) Visual communication through architectural presentation drawings. Line, value, color, and composition. Prerequisite: E.G. 1 or 3.



807. **ADVANCED CONSTRUCTION METHODS (3:1:5)** Integration of materials and systems in working drawings. Prerequisite: fourth-semester standing.
808. **GRAPHIC ANALYSIS (2:0:6)** Graphical analysis of force systems, centers of gravity, stresses in framed structures, arches, walls, moments, and deflections of beams. Prerequisites: E.G. 12, E.Mch. 811.
809. **STRUCTURE DESIGN (3:2:3)** Elementary principles of structural design and detailing in timber, steel, and reinforced concrete; use of handbooks, fundamentals of structural and architectural drafting. Prerequisites: E.Mch. 813; A.E. 802 or E.G. 803.
810. **ARCHITECTURAL ENGINEERING OFFICE PRACTICE (3:3:0)** Procedures involved in production of contract documents, both drawings and specifications. Prerequisite: fourth-semester standing.
812. **BUILDING LIGHTING AND ELECTRICAL LAYOUT (3:2:2)** Layout of lighting and electrical distribution in buildings.
813. **SITE PLANNING (2:1:2)** Energy conservation through optimum site utilization, contours, cut and fill calculations, storm drainage, spot grading, and finish grading. Prerequisite: A.E. 802.
814. **STEEL CONSTRUCTION (3:2:2)** Strength of materials as applied to the design of simple steel structures. Prerequisites: A.E. 802, E.Mch. 811.
815. **CONCRETE CONSTRUCTION (3:2:2)** Fundamentals of design and construction of reinforced concrete structures. Prerequisites: A.E. 802, E.Mch. 811.
830. **SELECTED TOPICS IN ARCHITECTURAL ENGINEERING TECHNOLOGY (3)** Individual or group work in architectural engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## ART (ART)

110. **DESIGN: TWO DIMENSIONAL (3:2:4)** Introduction to design in two dimensions. Pictorial space and the principles of visual organization of the flat surface.
111. **DESIGN: THREE-DIMENSIONAL (3:2:4)** Introduction to design in three dimensions. Principles of visual organization in working with actual space and volume.
120. **INTRODUCTION TO DRAWING (3:2:4)** The study and practice of basic drawing as a way of understanding and communicating.
121. **DRAWING: TECHNIQUES, MATERIALS, AND TOOLS (3:2:4)** Drawing with emphasis upon observation, organization, and particular emphasis on the development of skills. Prerequisite: Art 120.
180. **CERAMIC ARTS (3:2:4)** Introduction to potter's wheel techniques; experiments with decorative application; includes the technical concerns for clay, glazes, and kilns. For non-Art majors.
280. **INTRODUCTORY CERAMIC ARTS (3:2:4)** The fundamentals of ceramics, throwing, hand-building, and glazing; acquainting the student with ceramic materials, techniques, and philosophy. Prerequisite: 2 credits in studio art.
296. **INDEPENDENT STUDIES (1-18)**

## ART EDUCATION (A ED)

14. **INTRODUCTORY CRAFTS FOR TEACHERS (3:1:5)** Direct experience with materials such as wood, clay, metal, paper, textiles, and plastics in relationship to the creative needs of children.

## ART HISTORY (ART H)

100. **INTRODUCTION TO ART (3:3:0)** An approach to the understanding of art through a critical analysis of selected works of architecture, painting, and sculpture. Students who have passed Art H. 110 may not schedule this course.



## THE ARTS

110. **SURVEY OF WESTERN ART (3:3:0)** General survey of major developments in architecture, painting, and sculpture in the Western world. Students who have passed Art H. 100 may not schedule this course.

214. **MODERN ARCHITECTURE (3:3:0)** Architecture and related arts of sculpture and painting from the end of the eighteenth century to the present day. Nontechnical in nature.

305. **EUROPEAN ART FROM 1780–1860 (3:3:0)** A survey of painting and sculpture in Europe from the beginnings of Neoclassicism through the Realist movement. Prerequisite: Art H. 100 or 110 or 112.

307. **AMERICAN ART (3:3:0)** History of art in the English colonies and the United States from the seventeenth century to the present.

## THE ARTS (ARTS)

1. **THE ARTS (3:3:0)** Developing perception in the arts through relating the visual, musical, performing, and environmental arts.

## ASTRONOMY (ASTRO)

1. **ASTRONOMICAL UNIVERSE (3:3:0)** Nonmathematical description of the astronomical universe and the development of scientific thought. For nonscience majors. Students who have passed Astro. 90 may not schedule this course.

## BIOLOGICAL SCIENCE (BI SC)

1. **STRUCTURE AND FUNCTION OF ORGANISMS (3:3:0)** Origin, development, and cellular basis of life; fundamental principles, processes, and structures of organisms. Students who have passed Biol. 27, 41, 101, or 102 may not schedule this course.

2. **GENETICS, ECOLOGY, AND EVOLUTION (3:3:0)** How living organisms pass on their inheritance, how plants and animals came to be what they are, and how they now react. Students who have passed Biol. 33, 101, 102, or 222 may not schedule this course.

3. **MAN AND HIS ENVIRONMENT (3:3:0)** Kinds of environments; past and present uses and abuses of natural resources; disposal of man's wastes; prospects for the future. Students who have passed Biol. 210 or any other upper-level ecology course in biology may not schedule this course.

4. **BIOLOGY OF MAN (3:3:0)** A general survey of structure and function in man—from conception, through growth and reproduction, to death. Students who have passed Biol. 29 and 41 may not schedule this course.

## BIOLOGY (BIOL)

29. **MAMMALIAN ANATOMY (4:2:4)** Anatomy of a mammal, with special reference to that of man. Students who have passed Biol. 421 may not schedule this course.

33. **HUMAN GENETICS (3:3:0)** Human heredity and its individual and social implications. Students who have passed Biol. 222 may not schedule this course. Prerequisite: 3 credits in Biological Science.

41. **PHYSIOLOGY (3:3:0)** Normal functions of the animal body, with special reference to those of man. Students who have passed Biol. 472 may not schedule this course.

42. **PHYSIOLOGY LABORATORY (1:0:2)** Experiments demonstrating basic physiological principles, with special reference to man. Prerequisite or concurrent: Biol. 41.

101. **PRINCIPLES OF BIOLOGY I (4:3:2)** Introduction to cell biology; biology of vertebrates; overview of monerans, protists, and animals.

102. **PRINCIPLES OF BIOLOGY II (4:3:2)** Continuation of Biol. 101, with emphasis on plants and fungi; genetics of organisms and populations; evolution. Prerequisite: Biol. 101.

## BIOMEDICAL EQUIPMENT TECHNOLOGY (B E T)

801. **PHYSIOLOGICAL TRANSDUCERS (5:4:2)** Study of the principles of operation and applications of devices used for the conversion of physiological events to electrical signals. Prerequisite: E.E. 810.
802. **BIOMEDICAL INSTRUMENTATION AND SYSTEMS (5:4:2)** Introduction to the operating principles, calibration, and maintenance of biomedical instruments and systems with special emphasis given to patient safety. Prerequisite: B.E.T. 801.
803. **BIOMEDICAL EQUIPMENT LABORATORY (INTERNSHIP) (4:1:6)** Practical experience, within or related to the hospital environment, on a variety of biomedical instruments. Prerequisites: B.E.T. 804 and Biol. 41.
804. **MEDICAL AND CLINICAL EQUIPMENT (3:2:2)** Principles of operation of clinical, medical radiography, intensive care, anesthesia, respiratory, non-invasive imaging, and emergency equipment; hospital electrical safety. Prerequisite: B.E.T. 801.
830. **SELECTED TOPICS IN BIOMEDICAL EQUIPMENT TECHNOLOGY (3)** Individual or group work in biomedical equipment technology for students with specific occupational objectives. Prerequisite: third-semester standing.

## BUSINESS ADMINISTRATION (B A)

803. **COOPERATIVE PRACTICUM WITH BUSINESS OFFICES (6:0:12)** Cooperative practical work with business offices under the supervision of the instructor.

## BUSINESS LAW (B LAW)

243. **LEGAL ENVIRONMENT OF BUSINESS (3:3:0)** Social control through law: courts, basic policies underlying individual and contractual rights in everyday society. Prerequisite: third-semester standing.
850. **REAL ESTATE LAW (3:3:0)** Basic legal principles involved in the negotiation of real estate transactions.

## BUSINESS LOGISTICS (B LOG)

301. **BUSINESS LOGISTICS MANAGEMENT (3:3:0)** Management of logistics function in firm, including physical supply and distribution activities as transportation, storage facility location, and materials handling. Prerequisite: third-semester standing.
304. **TRANSPORT SYSTEMS (3:3:0)** Conceptual model of a transport system; environmental relationships; modal components and managerial conditions, with special application to the United States. Prerequisite: B.Log. 301.
305. **TRAFFIC MANAGEMENT (3:3:0)** Analysis of the traffic function in the logistics system. Evaluation of routes, rates, and shipping document procedures. Prerequisite: B.Log. 301 or 304.

## CHEMICAL ENGINEERING TECHNOLOGY (CH E)

810. **CHEMICAL TECHNOLOGY (4:4:0)** Industrial stoichiometry, material balances, heats of reaction. Prerequisite or concurrent: Chem. 13, 15.
811. **CHEMICAL TECHNOLOGY (5:5:0)** Fluid flow, heat transfer, evaporation, distillation, air-water interaction. Prerequisite: Ch.E. 810.
821. **CHEMICAL TECHNOLOGY LABORATORY (2:1:2)** Measurements in stoichiometry, material balances, and heats of reaction; industrial laboratory report writing. Prerequisite or concurrent: Ch.E. 810.
822. **CHEMICAL TECHNOLOGY LABORATORY (2:1:2)** Measurements in fluid flow, heat transfer, distillation, mass transfer; chemical analytical techniques. Prerequisite or concurrent: Ch.E. 811.
830. **INDUSTRIAL CHEMISTRY (3:3:0)** The commercial preparation of important chemicals and derivatives with emphasis upon the chemistry involved and the flow of material. Prerequisite or concurrent: Chem. 13, 15.

## CHEMISTRY

831. **SELECTED TOPICS IN CHEMICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in chemical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## CHEMISTRY (CHEM)

11. **INTRODUCTORY CHEMISTRY (3:2:2)** Selected principles and applications of chemistry. Prior study of chemistry not assumed.

12. **CHEMICAL PRINCIPLES (3-4)** Basic concepts and quantitative relations. Prerequisite: Satisfactory performance on placement examination—students take Chem. 12 for 3 credits. Unsatisfactory performance on placement examination—students take Chem. 12 for 4 credits.

13. **CHEMICAL PRINCIPLES (3:3:0)** Continuation of Chem. 12, including introduction to the chemistry of the elements. Prerequisite: Chem. 12. Prerequisite or concurrent: Chem. 14.

14. **EXPERIMENTAL CHEMISTRY (1:0:3)** Introduction to quantitative experimentation in chemistry. Prerequisite or concurrent: Chem. 12.

15. **EXPERIMENTAL CHEMISTRY (1:0:3)** Continuation of Chem. 14, with emphasis on analytical procedures. Prerequisite: Chem. 14. Prerequisite or concurrent: Chem. 13.

17. **INTRODUCTORY AND GENERAL CHEMISTRY (5:5:2)** Introductory and general chemistry for students who are required to take additional chemistry, e.g. Chem. 13, but are unprepared for Chem. 12. Students may not receive credit for both Chem. 17 and Chem. 11 or 12.

23. **INTRODUCTION TO MODERN ANALYTICAL CHEMISTRY (4:2:4)** Contemporary methods of chemical and instrumental analysis, including potentiometric titration, specific ion electrodes, spectrophotometry, and chromatography. Prerequisite: Chem. 15.

34. **ORGANIC CHEMISTRY (3:3:0)** Introduction to organic chemistry, with emphasis on the properties of organic compounds of biochemical importance. Not open to those who have previously scheduled Chem. 37. Prerequisite: Chem. 11 or 12 or 17.

35. **ORGANIC CHEMISTRY (3:2:4)** Introduction to organic chemistry, with emphasis on the identification of organic compounds by characteristic chemical reactions and by spectroscopy. Prerequisite: Chem. 34.

36. **LABORATORY IN ORGANIC CHEMISTRY (2:0:6)** Basic laboratory operations; applications of theories and principles. Prerequisite: Chem. 38. Prerequisite or concurrent: Chem. 39 or 40.

37. **ORGANIC CHEMISTRY (3:3:0)** Introduction to organic chemistry, with emphasis on topics of particular relevance to mineral science, materials science, and engineering. Not open to those who have previously scheduled Chem. 34. Prerequisite: Chem. 11 or 12.

38. **ORGANIC CHEMISTRY (4:4:0)** Principles and theories; nomenclature; chemistry of the functional groups; applications of spectroscopy. Students may not receive credit for both Chem. 38 and 34. Prerequisite: Chem. 13.

39. **ORGANIC CHEMISTRY (3:3:0)** Continuation of Chem. 38 to include especially polyfunctional organic molecules and the organic chemistry of biologically important molecules. Students may not receive credit for both Chem. 39 and 40. Prerequisite: Chem. 38.

40. **ORGANIC CHEMISTRY (2:2:0)** Continuation of Chem. 38 to include especially polyfunctional organic molecules. Students may not receive credit for both Chem. 39 and 40. Prerequisite: Chem. 38.

102. **ENVIRONMENTAL CHEMISTRY (3:3:0)** Applications of chemistry to environmental problems, including air, water, thermal pollution; pesticides; drugs and birth control agents; food additives; etc. For non-Chemistry majors; Chemistry majors will not receive credit.

389. **SPECIAL PROBLEMS AND RESEARCH (1-4)** Designed for freshman or sophomore students who are prepared to undertake special problems and research by arrangement with a faculty member.

395. **CHEMISTRY TEACHER ASSISTANT TRAINING (1-2)** Instruction and practice in the role of the teaching assistant in the undergraduate chemistry laboratory.

800. **GENERAL CHEMISTRY (3:2:3)** Basic principles of chemistry; properties and uses of some industrially important elements and compounds.



**CIVIL ENGINEERING TECHNOLOGY (C E)**

809. **TOPOGRAPHIC DRAWING (2:0:4)** Conventional mapping symbols; constructing topographic maps from stadia notes; estimating quantities from topographic maps. Prerequisite: E.G. 1 or 10. Prerequisite or concurrent: C.E. 811 or Wildl. 812.
810. **STATISTICS AND LEAST SQUARES (3:3:0)** Frequency distribution; histograms; frequency polygons; measures of central tendency; dispersion; uses of normal curve; least squares applied to surveying problems. Prerequisite: Math. 808.
811. **PLANE SURVEYING (3:2:3)** Theory of plane surveying; use, care, and adjustments of surveying equipment; traversing, areas, leveling, stadia, and plane table mapping. Prerequisite: Math. 807.
812. **CURVES AND EARTHWORK (3:2:3)** Computation and laying out of horizontal and vertical curves; calculation of cut and fill; setting slope stakes for construction. Prerequisite or concurrent: C.E. 811, Math. 807.
813. **PRACTICAL FIELD PROBLEMS (4:1:9)** Geodetics, topography, field astronomy; route location; hydrographic surveys; land subdivision; use of electronic measuring devices. Prerequisites: C.E. 812, 818.
814. **PHOTOGRAMMETRY (3:1:4)** Interpretation and use of aerial photographs; mapping by photogrammetric methods; application of aerial and terrestrial photographic surveying to specific engineering problems. Prerequisite: C.E. 818.
815. **GEODETIC SURVEYING (3:1:4)** Precision vertical and horizontal control surveys; level nets; reciprocal leveling; triangulation; state plane coordinates; astronomic observations for azimuth and latitude. Prerequisites: C.E. 811, Math. 807.
816. **SPECIAL SURVEYS (3:1:4)** Applications of surveying in hydrography, mining, construction, and subdivision planning; surveying registration law and professional ethics. Prerequisites: C.E. 812, 813.
817. **CARTOGRAPHIC TECHNIQUES (2:0:4)** Use of tools and equipment; projections used in art, advertising, government maps; relief methods; scribing techniques; map reproduction methods. Prerequisite: C.E. 809.
818. **ROUTE SURVEYING (2:0:4)** Field and office operations connected with highway and railroad location; mass diagram as related to economical distribution of earthwork. Prerequisite: C.E. 811. Concurrent: C.E. 812.
821. **CONCRETE TECHNOLOGY (3:2:2)** Characteristics of Portland cement concrete, physical properties of constituent materials, testing procedures, basics of reinforced concrete. Prerequisite or concurrent: E.Mch. 813.
822. **SOIL MECHANICS (3:2:2)** Identification, classification, sampling, testing, handling, and consolidation of soils for highway construction. Prerequisites: E.Mch. 811, Phys. 151.
823. **HIGHWAY ORGANIZATION AND OPERATIONS (3:2:2)** Fundamentals of technology; plans and specifications; drainage, cost, traffic studies, and highway safety. Prerequisite: second-year standing in Highway Engineering Technology.
824. **ASPHALT TECHNOLOGY (3:2:2)** The use and testing of asphaltic material as adapted to highways.
825. **CONSTRUCTION ESTIMATING (3:2:2)** Job organization, estimating, cost control, construction methods and equipment for highway construction projects.
830. **SELECTED TOPICS IN CIVIL ENGINEERING TECHNOLOGY (3)** Individual or group work in civil engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.
840. **HYDROLOGY AND DRAINAGE (3:2:2)** Introduction to railway hydrology and drainage, soil studies, erosion control, and hydraulic design of culverts. Prerequisites: C.E. 809, 811.
841. **ECONOMIC RAILWAY LOCATION AND GEOMETRIC DESIGN (3:2:2)** Railway economics, history, design, and maintenance of vertical and horizontal curves; speed and super-elevation. Prerequisites: C.E. 812, 818.
842. **RAILWAY TRACK MAINTENANCE AND OPERATION (3:2:2)** Specifications for safety standards for track, programming maintenance operations, track inspection. Prerequisite: C.E. 841. Concurrent: C.E. 843.
843. **RAILWAY TRACK STRUCTURE DESIGN AND CONSTRUCTION (3:2:2)** Design, layout, and



## COMMUNITY DEVELOPMENT

construction of yards, turnouts, interlocking plants, and structures. Prerequisite or concurrent: E.Mch. 813. Concurrent: C.E. 842.

861. FLUID FLOW (3:3:0) Elementary theory of fluid flow: hydrostatics; flow through orifices, Venturi meters, and pipes; flow in open channels; theory of the centrifugal pump. Prerequisites: E.Mch. 811, Math. 807.

890. LEGAL ASPECTS OF SURVEYING (2:2:0) Legal principles affecting the determination of property boundaries; responsibilities of surveyors, attorneys, title companies, and the court. Prerequisite: C.E. 811.

## COMMUNITY DEVELOPMENT (COM D)

7. INTRODUCTION TO COMMUNITY SYSTEMS (3:3:0) An introduction to the study of community, community systems, and impact on the individual.

170. COMMUNITY LEADERSHIP (2:2:1) Principles and techniques of participation in voluntary community groups concerned with strengthening family and community life.

## COMPUTER SCIENCE (CMPSC)

1. BASIC COMPUTER PROGRAMMING (1:0:2) Fundamental characteristics of digital computers; organization and coding of problems for solution on digital computer. Prerequisite: 2 entrance units in mathematics.

100. COMPUTER FUNDAMENTALS AND APPLICATIONS (3:3:0) Introduction to computer fundamentals and applications to data processing environments. Prerequisite: 2 entrance units in mathematics.

101. INTRODUCTION TO ALGORITHMIC PROCESSES (3:3:0) Properties of algorithms, languages, and notations for describing algorithms; applications of a procedure-oriented language to problem solving. Students who have passed Cmp.Sc. 201 or 203 may not schedule this course. Prerequisite: 2 entrance units in mathematics.

102. COMPUTER ORGANIZATION AND PROGRAMMING (3:3:0) Computer components and organization, representation of numbers and characters, instruction codes, machine language, programming, assembly systems, input-output, subroutines, and macros. Prerequisite: Cmp.Sc. 101.

120. INTERMEDIATE PROGRAMMING (4:3:3) Systematic programming: top-down program development, documentation, and testing. Verification of program correctness. Introduction to data structures, numerical methods. Prerequisites: Cmp.Sc. 101 or 201; Math. 140.

140. INTRODUCTION TO DATA PROCESSING (3:3:0) Applications of digital computers to problems in data processing with examples from accounting, record updating, inventory control, and report generation. Prerequisite: Cmp.Sc. 101.

144. DATA ORGANIZATION AND ACCESSING TECHNIQUES (4:3:2) Design characteristics of external storage devices; record organizations; accessing considerations for sequential, direct, relative, and indexed files; internal data structures. Prerequisites: Cmp.Sc. 102, 140.

154. ADVANCED ASSEMBLER, I/O TECHNIQUES, AND JOB CONTROL LANGUAGES (3:3:1) Macro-expansion; assembler-level I/O control; COBOL-assembler linkage conventions; advanced debugging techniques; assembler design; op-system features and JCL techniques. Students may not take both Cmp.Sc. 154 and 442 for credit. Prerequisite: Cmp.Sc. 144.

164. CONTEMPORARY TRENDS IN COMPUTER PROGRAMMING (3:3:0) State of the technology in design, code, test, and documentation techniques for information processing systems and large EDP production programs. Students may not take both Cmp.Sc. 164 and 444 for credit. Prerequisite: Cmp.Sc. 154.

803. COMPUTER APPLICATIONS IN BUSINESS (3:3:0) Characteristics of digital computers; the role of data processing in business; programming in a high-level language. Designed for two-year business administration students. Students who have passed Cmp.Sc. 101, 201, or 203 may not schedule this course.

804. COMPUTER FUNDAMENTALS AND APPLICATIONS (2:2:0) Types of computers and computer systems; storage and I/O devices; number systems and data representation; computer applications; typical EDP organization.

805. **COMPUTER APPLICATION PROBLEM (1-3)** The organization, flow charting, programming, debugging, and documentation of a major applied problem in a field of computer application. Prerequisite: fourth-semester standing.

890. **SPECIAL TOPICS IN COMPUTER PROGRAMMING (1-3)** Application of any of several specific computer programming languages to problem solving. Prerequisite: Cmp.Sc. 101.

## **CURRICULUM AND INSTRUCTION (C I)**

295. **INTRODUCTORY FIELD EXPERIENCE FOR TEACHER PREPARATION (2-3 per semester, maximum of 6)** Selected observation of schooling situations with small group and tutorial participation. Prerequisite: second-semester standing. Concurrent: Ed.Th.P. 115 and/or Ed.Psy. 14.

## **DIETETIC FOOD SYSTEMS MANAGEMENT (D S M)**

100. **THE PROFESSION OF DIETETICS (1:1:0)** Introduction to the profession and exploration of the roles and responsibilities of dietetic professionals.

103. **INTRODUCTION TO HEALTH FACILITIES FOOD SERVICE (3:3:0)** Professional functions of the hospital food service system, relationships with the nutrition component of food service system, and organization served.

205. **HUMAN RELATIONS AND DIETETIC SUPERVISORY SKILLS (3:3:0)** Theories and principles of supervision and training of food service employees for overall operational effectiveness.

250. **QUANTITY FOOD PRODUCTION MANAGEMENT (4:3:1)** Systems approach to managing quantity food production functions in health care settings; included are quantity food production principles and standards.

260. **MANAGEMENT OF FOOD SERVICE OPERATING SYSTEMS (4:3:1)** Major principles related to managing the purchasing, food, and labor subsystems of a health care food service system. Prerequisite: D.S.M. 250.

295. **PROFESSIONAL STAFF FIELD EXPERIENCE (4:3:1)** Methods of, and practice in, the client-oriented dietetic systems in health care facilities. Prerequisites: D.S.M. 260, 304.

304. **MARKETING OF FOOD SERVICES IN HEALTH CARE FACILITIES (3:3:0)** Theories and applications of marketing principles to the design of consumer-oriented dietetic services.

## **EARTH SCIENCE (EARTH)**

1. **EARTH SCIENCE (3:3:0)** Integrated approach to fundamental problems in the earth sciences. Fields of study include geological sciences, physical geography, and meteorology. No credit will be given for this course if a student takes Geosc. 20, Geog. 19, or Meteo. 2.

## **ECONOMICS (ECON)**

2. **INTRODUCTORY MICROECONOMIC ANALYSIS AND POLICY (3:3:0)** Methods of economic analysis and their use; economic aggregates; price determination; theory of the firm; distribution.

4. **INTRODUCTORY MACROECONOMIC ANALYSIS AND POLICY (3:3:0)** National income measurement; aggregate economic models; money and income; policy problems.

14. **PRINCIPLES OF ECONOMICS (3:3:0)** Analysis of the American economy, emphasizing the nature and interrelationships of such groups as consumers, business, governments, labor, and financial institutions. Students who have passed Econ. 2 or 4 or are registered in the College of Business Administration may not schedule this course.

315. **LABOR ECONOMICS (3:3:0)** Economic analysis of employment, earnings, and the labor market; labor relations; related government policies. Prerequisite: Econ. 2.

## **EDUCATIONAL PSYCHOLOGY (EDPSY)**

14. **LEARNING AND INSTRUCTION (3:3:0)** Psychology of human learning applied toward the achievement of educational goals; evaluation of learning outcomes.



## EDUCATIONAL THEORY AND POLICY (EDTHP)

115. EDUCATION IN AMERICAN SOCIETY (3:3:0) Introduction to the development of educational institutions, with emphasis on historical, philosophical, and sociological forces.

## ELECTRICAL ENGINEERING TECHNOLOGY (E E)

800. APPLIED ELECTRICITY (2:1:3) Fundamentals of electric circuits; basic principles of electrical machinery and devices; electrical-mechanical analogies; beginning electronics. Prerequisite: Math. 807.

801. FUNDAMENTALS OF D.C. CIRCUITS (4:4:0) Fundamental theory of resistance, current, voltage. Direct-current circuit concepts developed from simplest series circuit through loop analysis; Thevenin's theorem. Prerequisite or concurrent: Math. 807.

804. A.C. CIRCUITS (2:2:0) Application of network theorems, laws, and methods to alternating-current circuits; balanced and unbalanced polyphase systems. Prerequisite: E.E. 814.

805. SEMICONDUCTOR LABORATORY (1:0:2) Laboratory study of semiconductors. Assembly and tracing of electronic circuits. Concurrent: E.E. 810.

806. A.C. CIRCUITRY LABORATORY (1:0:2) Laboratory study of alternating-current circuits; assembly and tracing of electrical circuits. Concurrent: E.E. 804.

809. D.C. CIRCUITS LABORATORY (1:0:2) Introduction to electrical apparatus, including instruments, their interconnection into basic circuits, observation of circuit behavior, and report writing. Concurrent: E.E. 801.

810. FUNDAMENTALS OF SEMICONDUCTORS (3:3:0) Semiconductor physics and circuit theory including hybrid parameters; equivalent circuits; power amplifiers and frequency response of small signal amplifiers. Prerequisite or concurrent: E.E. 814, Math. 808.

811. MICROPROCESSORS (3:2:2) Fundamentals of microprocessors, their application, and interfacing for data processing and control. Prerequisite: E.E. 814.

813. FUNDAMENTALS OF ELECTRICAL MACHINES (3:2:2) Direct-current machinery principles and applications; introduction to machines and basic concepts of laboratory methods related to machinery studies. Prerequisites: E.E. 814, 818.

814. ELECTRICAL CIRCUITS (3:3:0) Direct-current circuit analysis; introduction to basic magnetism and magnetic circuits; single-phase circuit fundamentals. Prerequisites: E.E. 801, Math. 807.

815. A.C. MACHINERY AND CONTROL (3:3:0) Alternating-current machinery principles and applications; survey of alternating- and direct-current machinery control methods. Prerequisites: E.E. 804, 813.

816. LINEAR ELECTRONIC CIRCUITS (3:3:0) Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, vacuum tubes, and operational amplifiers. Prerequisite: E.E. 810.

817. DIGITAL ELECTRONICS (4:4:0) Fundamentals and application of pulse and digital circuits and electronic devices, such as unijunction transistors, photo devices, and zener diodes. Prerequisite: E.E. 810.

818. ELECTRICAL CIRCUITS LABORATORY (2:0:4) Laboratory study of direct-current networks and alternating-current circuits. Prerequisite: E.E. 809. Concurrent: E.E. 814.

819. A.C. MACHINERY LABORATORY (1:0:2) Alternators, induction generators, single- and polyphase motors, synchro units; transformers, saturable reactors, and protective devices. Prerequisite: E.E. 806. Concurrent: E.E. 815.

820. DIGITAL ELECTRONICS LABORATORY (1:0:2) Laboratory study of solid state pulse, digital, industrial, and motor control circuits. Prerequisite: E.E. 805. Concurrent: E.E. 817.

821. LINEAR ELECTRONICS LABORATORY (1:0:2) Laboratory study of transistors; study of differential and operational amplifiers. Emphasis is placed on circuit design. Prerequisite: E.E. 805. Concurrent: E.E. 816.

830. SELECTED TOPICS IN ELECTRICAL ENGINEERING TECHNOLOGY (3) Individual or group work in electrical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## ENGINEERING (ENGR)

2. **ENGINEERING ORIENTATION (1:0:2)** Introduction to efficient methods for analyzing and solving engineering problems.

5. **EXPERIMENTAL METHODS FOR ENGINEERS (1:0:2)** Introduction to experimental methods used in engineering. Applications of basic experimental and computational concepts through student involvement in laboratory experiments.

## ENGINEERING GRAPHICS (E G)

1. **ENGINEERING DRAWING (2:1:3)** Technical skills and drafting room practices; fundamentals of theoretical graphics; orthogonal, oblique, and perspective projections; working and schematic drawings.

3. **ARCHITECTURAL GRAPHICS (2:0:6)** Principles of architectural drawing; spatial relationships of points, lines, planes, and solids, with architectural applications; shadows, perspective.

10. **INTRODUCTORY ENGINEERING GRAPHICS (1:0:3)** Multiview projections, pictorial drawings, dimensioning, engineering standards, and working drawings.

11. **ENGINEERING DESIGN GRAPHICS (1:0:3)** Introduction to creative design, space analysis, graphs, graphical mathematics, vector analysis, and design implementation. Prerequisite: E.G. 10 or 21.

12. **SPATIAL ANALYSIS (2:1:3)** Spatial relations of points, lines, and solids, with engineering applications. Prerequisite: 1 credit of introductory graphics.

50. **ENGINEERING METHODS AND GRAPHICAL COMMUNICATION (3:1:5)** Introduction to engineering through experimental methods of measurement and graphical expressions; multiviews, pictorials, dimensioning, space analysis, graphical mathematics, laboratory experience.

800. **DRAWING ROOM STANDARDS AND PRACTICES (2:0:6)** Interpretation of various types of engineering drawings, including dimensional systems, symbols, and American standard drafting room practices. Prerequisite: E.G. 10.

803. **ADVANCED ENGINEERING DRAWING (3:1:4)** Application of principles of engineering drawing, including auxiliary views in the layout of detail, assembly, and working drawings. Prerequisite: E.G. 1.

830. **SELECTED TOPICS IN ENGINEERING GRAPHICS (1-3)** Individual or group work in engineering graphics offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## ENGINEERING MECHANICS (E MCH)

810. **BASIC MECHANICS (2:2:0)** Forces; moments; resultants; equilibrium of force systems; introduction to dynamics. Prerequisite: Math. 807.

811. **ELEMENTARY MECHANICS (3:3:0)** Forces; moments; resultants; equilibrium of force systems; friction; centroids and moment of inertia of areas; dynamics of particles. Prerequisite: Math. 807.

812. **INTRODUCTION TO DYNAMICS (3:2:2)** Absolute and relative motion related to particles and simple linkages. Force-mass-acceleration, work-energy, and impulse-momentum solution techniques. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Math. 808.

813. **STRENGTH AND PROPERTIES OF MATERIALS (3:3:0)** Axial stress and strain; shear; riveted and welded connections; torsion; beam stresses and deflections; combined axial and bending stresses; columns, ductility, resilience, and toughness. Prerequisite: E.Mch. 811.

814. **STRENGTH OF MATERIALS LABORATORY (1:0:2)** Measurement of mechanical properties of materials; structural testing. Concurrent: E.Mch. 813.

## ENGLISH (ENGL)

4. **BASIC WRITING SKILLS (3:3:0)** Intensive practice in writing sentences and paragraphs and instruction in grammar, usage, and punctuation. Designed for students with deficient preparation. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*



5. **WRITING TUTORIAL (1:0:2)** Tutorial instruction in composition and rhetoric for students currently enrolled in Engl. 4 or 15. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*
15. **RHETORIC AND COMPOSITION (3:3:0)** Instruction and practice in writing expository prose that shows sensitivity to audience and purpose. Prerequisite: Engl. 4 or satisfactory performance on the English proficiency examination.
30. **HONORS FRESHMAN COMPOSITION (3:3:0)** Writing practice for specially qualified and screened students. Students who have passed a special writing test will qualify for this course.
101. **UNDERSTANDING LITERATURE (3:3:0)** Introduction to the human and artistic values in selected short stories, novels, poems, and plays. Intended for nonmajors.
102. **GREAT BOOKS OF BRITISH LITERATURE (3:3:0)** Introduction to British literature through the reading and discussion of significant works. Intended for nonmajors.
103. **GREAT BOOKS OF AMERICAN LITERATURE (3:3:0)** Introduction to American literature through the reading and discussion of significant works. Intended for nonmajors.
104. **THE BIBLE AS LITERATURE (3:3:0)** Study of the English Bible as a literary and cultural document.
129. **SHAKESPEARE (3:3:0)** A selection of the major plays studied to determine the sources of their permanent appeal. Not recommended for English majors.
133. **MODERN AMERICAN LITERATURE TO WORLD WAR II (3:3:0)** Eliot, Frost, Faulkner, Fitzgerald, Hemingway, O'Neill, and other writers representative of the years between the world wars.
134. **AMERICAN COMEDY (3:3:0)** Studies in American comedy and satire, including such writers as Mark Twain, Faulkner, Vonnegut, and Heller.
139. **BLACK AMERICAN LITERATURE (3:3:0)** Fiction, poetry, and drama, including such writers as Baldwin, Douglass, Ellison, Morrison, and Wright.
140. **CONTEMPORARY LITERATURE (3:3:0)** Writers such as Barth, Beckett, Bellow, Ellison, Lowell, Mailer, Pinter, Plath, and Vonnegut.
165. **GREAT ENGLISH NOVELS (3:3:0)** Introduction to selected major novels by such writers as Defoe, Fielding, Austen, Bronte, Dickens, Hardy, Conrad, Joyce, Lawrence, and Woolf.
167. **POETRY (3:3:0)** Introduction to the appreciation and analysis of English and American poetry.
168. **DRAMA (3:3:0)** Introduction to the range of dramatic expression in selected plays, primarily English and American.
184. (C.Lit. 184) **THE SHORT STORY (3:3:0)** Lectures, discussion, readings in translation, with emphasis on major writers of the classical, medieval, Renaissance, and modern periods.
185. (C.Lit. 185) **THE MODERN NOVEL IN WORLD LITERATURE (3:3:0)** Development of the modern novel in the last century (outside the British Isles and the United States); lectures, discussions, readings in translation.
189. (C.Lit. 189) **FOUNDATIONS OF MODERN DRAMA (3:3:0)** Playwrights who set the world's stage for twentieth-century drama: Ibsen, Shaw, Chekhov, and Strindberg.
191. **SCIENCE FICTION (3:3:0)** Science fiction as the literature of technological innovation and social change—its development, themes, and problems.
192. **THE LITERATURE OF FANTASY (3:3:0)** Major realms of fantasy in English and American literature: daydream and nightmare, the pastoral, dystopia, utopia, apocalypse, and the heroic.
194. **WOMEN WRITERS (3:3:0)** Short stories, novels, poetry, drama, and essays by major English and American women writers since 1870.
196. (Folk. 196) **ESSENTIALS OF ANGLO-AMERICAN FOLKLORE (3:3:0)** A basic introduction to verbal and nonverbal folklore, stressing the basic procedures of collection, classification, and analysis.
197. **AMERICAN FOLK SONG IN THE ENGLISH (3:3:0)** British songs in America; native repertoires, white and Negro; folk ballad; and musical development.
201. **EXPOSITORY WRITING FOR SOCIAL SCIENTISTS (3:3:0)** Instruction in writing persuasive arguments about significant issues in the social sciences. Prerequisite: Engl. 15 or 30; fourth-semester standing.

211. **WRITING EXPOSITORY PROSE (3:3:0)** Develops skill in writing expository papers on a range of subjects. Prerequisite: Engl. 15 or 30; fourth-semester standing.
218. **TECHNICAL WRITING (3:3:0)** The writing of technical reports. Primarily for juniors and seniors in technical and scientific majors. Prerequisite: Engl. 15 or 30; fourth-semester standing.
219. **BUSINESS WRITING (3:3:0)** Writing reports and other common forms of business communication. Prerequisite: Engl. 15 or 30; fourth-semester standing.
297. **SPECIAL TOPICS (1-9)**
826. **REPORT WRITING (3:3:0)** Interpretation of statistical data and writing of technical reports. Prerequisite: Engl. 4 or 15.

## FILM (FILM)

180. **THE ART OF THE CINEMA (3:3:0)** The development of cinema to its present state; principles of evaluation and appreciation; examples from the past and present.

## FINANCE (FIN)

100. **INTRODUCTION TO FINANCE (3:3:0)** The nature, scope, and interdependence of the institutional and individual participants in the financial system. May not be scheduled by College of Business Administration students. Prerequisite: fifth-semester standing.
108. **PERSONAL FINANCE (3:3:0)** Personal management of budgets, bank accounts, loans, credit buying, insurance, real estate, and security buying. May not be scheduled by College of Business Administration students. Prerequisite: third-semester standing.
301. **CORPORATION FINANCE (3:3:0)** The acquisition and management of corporate capital; analysis of operations, forecasting capital requirements, raising capital, and planning profits. Prerequisites: Acctg. 101; Econ. 2, 4; Math. 111; Q.B.A. 101.
310. **COMMERCIAL BANK MANAGEMENT (3:3:0)** Fundamental principles underlying management of a commercial bank; capital funds; asset and liability management; value maximization; legal and operational constraints. Prerequisite: Fin. 301.
810. **COMMERCIAL BANK MANAGEMENT (3:3:0)** Managerial processes within the banking industry.

## FORESTRY (FOR)

203. **FIELD DENDROLOGY (2:0:6)** Identification of trees and shrubs by leaf, fruit, bud, twig, and bark.
220. **FOREST ECOSYSTEM PROTECTION (3:3:0)** Principles and concepts involved in managing the forest ecosystem in regard to fires, insects, and diseases.
221. **FOREST FIRE TECHNOLOGY (1:0:3)** Technological aspects of controlling and using fire in the forest environment. Prerequisite: For. 220.
240. **SILVICULTURAL PRACTICES (3:2:3)** Principles and techniques of forest establishment, culture, regeneration, and harvesting. Prerequisite: For. 203.
241. **AERIAL PHOTO INTERPRETATION (4:2:6)** Aerial photo interpretation techniques applied to land management inventories, mapping, road location, and procurement. Prerequisites: For. 203; 804 and 806, or 366.
242. **ELEMENTS OF PROJECT SUPERVISION IN FORESTRY (3:3:0)** Supervisory techniques developed through an understanding of the behavioral sciences applied to field forestry personnel management.
804. **FOREST MENSURATION (3:2:3)** Measurement of forests and forest products.
806. **FOREST INVENTORIES (3:2:3)** Application of land surveying and sampling techniques, including statistical analysis, for the determination of timber volume and growth.
807. **FOREST RECREATION (3:2:3)** Development, construction, and management of forest recreation areas and facilities. Prerequisite: For. 841.
808. **FOREST PROTECTION (3:2:3)** Forest fire prevention, detection, behavior, and suppression; fire plans and statistics; insect and disease control.
809. **FOREST VALUATION (3:2:3)** Determination of forest values through a consideration of

## FRENCH

markets, logging and milling costs, stumpage appraisals, and other forest values. Prerequisite: For. 806.

814. FORESTRY LEADERSHIP PRACTICUM (1:0:3) Leadership techniques applied to standard forestry field operations. Prerequisite or concurrent: For. 812.

817. URBAN FORESTRY (3:2:3) The application of land treatment techniques and forestry practices to urban environments. Prerequisites: For. 802, 807.

818. INDIVIDUAL STUDIES (1-3 per semester) Individual study of forest technology.

820. ADVANCED FOREST MEASUREMENTS (1) Application of point and 3P sampling methods as a means of developing the data base for integrated forest management planning. Prerequisites: For. 809, 826.

821. FIELD STUDIES IN ECOLOGY (1) Field studies in ecological problems, challenges, and impacts related to normal forest practices in general resource management. Prerequisites: For. 809, 826.

822. FOREST MANAGEMENT SYSTEMS (1) Field projects in the integrated application of silvicultural, mensurational, and financial principles in forest management planning. Prerequisites: For. 809, 826.

824. INTRODUCTION TO HARVESTING (1:0:3) Practical instruction in the use and maintenance of hand tools and small power tools used in logging operations.

825. HARVESTING TECHNIQUES (1:0:3) Practical instruction in the operation of heavy equipment used in timber harvesting. Prerequisite: For. 824.

826. REFORESTATION AND INTERMEDIATE OPERATIONS (1:0:3) Field practicum in planting, pruning, thinning forest stands. Prerequisite: For. 825.

827. FIELD STUDY PREPARATION (1) Developing practices, procedures, and materials for conducting integrative field studies. Prerequisites: For. 241, 802, 809.

828. SAWMILL ORIENTATION (1:1:0) An overview of sawmill industry equipment, processes, and products.

829. SAWMILL BUSINESS MANAGEMENT (3:2:3) Fundamental business practices applied to a small sawmill business enterprise. Prerequisite: For. 828.

830. SAWMILL OPERATION (3:2:3) Technical and applied aspects of sawmilling. Prerequisite: For. 828.

831. SAWMILL OPERATION PRACTICUM (4) Extended hands-on experience to develop operational competencies in running a small sawmill. Prerequisite: For. 830.

840. LETTERING AND DRAFTING (2:1:4) Freehand and transfer lettering skill development and drafting room practices.

841. FOREST SURVEYING (4:2:8) Plane surveying and mapping techniques as applied to forestry practices. Prerequisites: For. 840, Math. 801.

## FRENCH (FR)

1. ELEMENTARY FRENCH (4:3:2) Grammar, with reading and writing of simple French; oral and aural work stressed.

2. ELEMENTARY FRENCH (4:3:2) Grammar and reading continued; oral and aural phases progressively increased. Prerequisite: Fr. 1.

3. INTERMEDIATE FRENCH (4:3:2) Grammar, reading, composition, oral and aural exercises. Prerequisite: Fr. 2.

140. FRENCH NOVEL IN ENGLISH TRANSLATION (1-6) Readings of selected French masterpieces in translation; discussion of recurring themes in several literary periods.

## GEOGRAPHY (GEOG)

19. GEOGRAPHY OF MAN'S ENVIRONMENT (3:2:2) Survey and synthesis of processes creating geographical patterns of natural resources, with application of basic environmental processes in resource management.

20. MAN'S WORLD: AN INTRODUCTION TO MODERN HUMAN GEOGRAPHY (3:3:0) Spatial



perspective on human societies in a modernizing world; regional examples; use of space and environmental resources; elements of geographic planning.

24. **ELEMENTS OF CULTURAL GEOGRAPHY (3:3:0)** Locational analysis of changes in non-Western cultures. Problems of plural societies, economic development, population growth, and settlement.

26. **HUMAN GEOGRAPHY (3:3:0)** Introduction to concepts, principles, and theories of spatial organization.

## GEOSCIENCES (GEOSC)

\*1. **PHYSICAL GEOLOGY (3:2:3)** Earth processes and their effects on the materials, structure, and morphology of the earth's crust. Practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps.

\*20. **OUR EARTH (3:2:2)** Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation.

\*21. **EARTH HISTORY (3:2:2)** Evolution of the earth; changing patterns of mountains, lowlands, and seas; development of living organisms. Practicum includes field trips, studies of geologic maps, geologic problems, fossils.

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\*This course includes from one to several field trips for which an additional charge will be made to cover transportation.

## GERMAN (GER)

1. **BASIC GERMAN (4:3:2)** Listening, speaking, reading, writing; introduction to basic structures and vocabulary through dialogs and literary and cultural readings. Students may receive credit for only one of the following: Ger. 1, 11, or 15.

2. **BASIC GERMAN (4:3:2)** Listening, speaking, reading, writing; introduction to basic structures and vocabulary through dialogs and literary and cultural readings. Students may receive credit for only one of the following: Ger. 2, 12, or 16. Prerequisite: Ger. 1.

3. **INTERMEDIATE GERMAN (4:3:2)** Continued skill development; readings consisting of short literary and journalistic writings; increased attention to German cultural context. Students may receive credit for only one of the following: Ger. 3, 12, or 16. Prerequisite: Ger. 2.

100. **GERMAN CULTURE AND CIVILIZATION (3:3:0)** Life of the German people from the early Middle Ages to modern times; their literature and arts, music, science, and philosophy. Conducted in English.

## HEALTH EDUCATION (HL ED)

19. **MAN AND DISEASE (1:1:0)** Essentials of communicable and chronic disease control.

45. **ALCOHOL AWARENESS EDUCATION (1:1:0)** A course designed to raise awareness relative to the use and abuse of beverage alcohol.

46. **INTRODUCTION TO HEALTH ASPECTS OF HUMAN SEXUALITY (1:1:0)** An examination of health concerns related to sexuality and sexual behavior.

48. **VALUES AND HEALTH BEHAVIOR (1:1:0)** An exploration of opinions, beliefs, attitudes, and personal values as they relate to decision making and health behavior.

57. **CONSUMER HEALTH (1:1:0)** Essentials for determining credibility of claims for particular health services and products from a consumer's perspective.

303. **EMERGENCY CARE (2:1:2)** Competencies leading to American Red Cross Advanced First Aid and Emergency Care and American Heart Association Cardiopulmonary Resuscitation certification.

384. **APPLIED KINESIOLOGY (3:2:2)** Study of anatomical structure, body movement. Characteristic muscle action and motion will be analyzed in relation to physical therapy context. Prerequisite: Biol. 29.

800. **PHYSICAL THERAPIST ASSISTANT — INTRODUCTION (3:2:2)** Orientation to the field of



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physical therapy, historical background of the profession, professional ethics, medical terminology, and patient transportation techniques.

801. **PHYSICAL THERAPIST ASSISTANT — PROCEDURES (4:2:4)** General considerations for physical therapy modalities; development of skills and their application; diagnostic testing. Prerequisite: HI.Ed. 800.

803. **MEDICAL SURGICAL ORIENTATION TO THERAPY (3:3:0)** Introduction to medical and post-operative conditions and/or disease states most frequently treated by physical therapy modalities. Prerequisites: Biol. 29, 41, 42.

804. **THERAPEUTIC EXERCISE (3:2:4)** Introduction to the principles of exercise in the treatment of disease and injury.

805. **REHABILITATION (2:1:3)** Examination of techniques and practical experience with appliances used in the rehabilitation of the physically disabled.

806. **PHYSICAL THERAPIST ASSISTANT — PRACTICUM (10)** The practice of physical therapist assistant skills in a clinical setting under the direct supervision of a registered physical therapist. Prerequisites: HI.Ed. 804, 805.

807. **TECHNIQUES FOR EFFECTIVE PATIENT INTERACTION (1:1:1)** Techniques of interacting with the sick or disabled patient; emphasis will be on enhancing interaction skills. Prerequisite: Psy. 2.

## HISTORY (HIST)

1. **THE WESTERN HERITAGE I (3:3:0)** A survey of the Western heritage from the ancient Mediterranean world to the dawn of modern Europe.

2. **THE WESTERN HERITAGE II (3:3:0)** A survey of the Western heritage from the dawn of modern Europe in the seventeenth century to the present.

10. **NON-WESTERN CIVILIZATIONS (3:3:0)** Introduction to social, economic, and political evolution of non-Western cultures; responses to the West; modernization and development.

12. **HISTORY OF PENNSYLVANIA (3:3:0)** Chronological and topical survey, emphasizing immigration of diverse ethnic groups and religious, political, economic, and social developments, including industrialization and urbanization.

20. **AMERICAN CIVILIZATION TO 1877 (3:3:0)** An historical survey of the American experience from its colonial beginnings through the Civil War and Reconstruction.

21. **AMERICAN CIVILIZATION SINCE 1877 (3:3:0)** An historical survey of the American experience from the emergence of urban-industrial society in the late nineteenth century to the present.

100. **ANCIENT GREECE (3:3:0)** Greek world from the earliest Aegean cultures to the death of Alexander the Great and the beginnings of Hellenistic civilization.

101. **THE ROMAN REPUBLIC AND EMPIRE (3:3:0)** History of the Roman Republic and Empire from the origins of Rome to the disintegration of the Empire.

107. **MEDIEVAL EUROPE (3:3:0)** Rise and development of the civilization of medieval Europe from the decline of Rome to 1500.

120. **MODERN EUROPE, 1815 TO THE PRESENT (3:3:0)** Political, social, and ideological developments; origin and impact of two World Wars; totalitarianism and democracy; changing role in the world.

141. **MEDIEVAL AND MODERN RUSSIA (3:3:0)** Introductory survey, including political, social, economic, and cultural development of Kievan, Muscovite, and Imperial Russia.

142. **HISTORY OF COMMUNISM (3:3:0)** Marxism; Leninism and evolution of the Soviet Union; formation and development of the Communist bloc; impact of Chinese Communism.

143. **HISTORY OF FASCISM AND NAZISM (3:3:0)** The study of right-wing totalitarianism in the twentieth century, with special emphasis on Fascist Italy and Nazi Germany.

144. **THE WORLD AT WAR: 1939-1945 (3:3:0)** In-depth study of the origins and conduct of World War II. Political and economic aspects as well as military.

150. **COLONIAL PENNSYLVANIA (3:3:0)** Development of the colony of Pennsylvania through the war for American independence, covering immigration, economics, politics, religion, and society.

151. **TECHNOLOGY AND SOCIETY IN AMERICAN HISTORY (3:3:0)** Development of technology in

America from colonial times; its reception and its influence on social, economic, and political life.

152. **THE AFRO-AMERICAN EXPERIENCE (3:3:0)** African roots; colonial and revolutionary experiences; slavery and abolitionism; civil war and reconstruction; accommodation and protest; the new militancy.

154. **HISTORY OF WELFARE IN AMERICA (3:3:0)** History of the care of dependent people (including children, the aged, mentally ill, unemployed) from colonial times to the present.

155. **AMERICAN BUSINESS HISTORY (3:3:0)** The development of business from the planting of the colonies, through the stages of industrialization, to the present.

156. **(L.S. 156) HISTORY OF THE AMERICAN WORKER (3:3:0)** A study of the American worker from the preindustrial era to the present.

158. **HISTORY OF AMERICAN IMMIGRATION (3:3:0)** The waves of migration to America and an analysis of the resulting minority groups, their reception, assimilation, and persisting identity.

171. **HISTORY OF MODERN SOUTHEAST ASIA (3:3:0)** Sociopolitical survey of Southeast Asian history emphasizing the modern period. Origins of traditional civilization, colonialism and nationalism, problems of independence.

174. **THE HISTORY OF TRADITIONAL EAST ASIA (3:3:0)** Comparative cultural, institutional, and social history of traditional China and Japan to their contact with the industrialized West.

175. **THE HISTORY OF MODERN EAST ASIA (3:3:0)** Comparative survey of the internal developments and external relations of China and Japan since their contact with the industrialized West.

178. **LATIN-AMERICAN HISTORY TO 1820 (3:3:0)** Conquest of the New World, development of colonial institutions, impact on native cultures, and origins of independence movements.

179. **LATIN-AMERICAN HISTORY SINCE 1820 (3:3:0)** Origin, political growth, international relations, and economic status of the Latin-American republics, with emphasis upon present-day conditions.

181. **INTRODUCTION TO THE MIDDLE EAST (3:3:0)** Origins of Islamic civilization; expansion of Islam; the Ottoman Empire; the Middle East since 1918.

191. **EMERGING AFRICA (3:3:0)** Indigenous African societies; impact of Rome, Islam, and Europe; slave trade; colonialism; nationalism; problems since independence.

195. **HISTORY OF CANADA (3:3:0)** An integrated survey from French colonial beginnings to modern Dominion status, with special emphasis on relations with the United States.

## **HOTEL AND FOOD SERVICE (H F S)**

802. **SANITATION PRACTICES IN FOOD SERVICE OPERATIONS (3:3:0)** Practical applications related to the management of the sanitation subsystem within a food service operation.

804. **HOTEL AND FOOD SERVICE MERCHANDISING (3:3:0)** Merchandising as a system distributing benefits, collecting costs, concerned with motivating consumers. Topics include promotion, menu planning, and research methods.

805. **TRAINING AND SUPERVISION (3:3:0)** Methods and techniques of training and supervising food service and housing employees for overall efficiency of operation.

810. **FOODS EXPERIENCE (4:3:2)** Theory, observation, and practice in food services; emphasis on planning, preparation, and service in commercial food operations.

850. **FOOD SERVICE DELIVERY SYSTEMS (4)** Physical characteristics of principal food product groups considered. Topics include purchasing problems, preparation techniques, quality and cost control. Prerequisites: Acctg. 101, H.R.&I.M. 225.

860. **FOOD SERVICE SUPERVISION (4)** The principal food service administrative routines are considered from the point of view of the supervisor and middle manager. Prerequisite: H.F.S. 850.

870. **FOOD AND BEVERAGE ADMINISTRATION (4)** Components of food service systems are identified and studied as separate problems and as a total system. Prerequisite: H.F.S. 860.



## **HOTEL, RESTAURANT, AND INSTITUTIONAL MANAGEMENT (HR&IM)**

102. INTRODUCTION TO CAREERS IN THE HOSPITALITY INDUSTRY (2:2:0) Exploration and analysis of management opportunities in various segments of the hospitality industry.
225. FOOD, BEVERAGE, AND LABOR COST CONTROL (3:3:0) Techniques for analyzing and controlling food, beverage, and labor costs in hospitality organizations. Prerequisite: 3 credits in Accounting.
295. ANALYSIS OF FIELD EXPERIENCE I (1:1:0) Directed analysis and presentation of the 300-hour hospitality working experience, focusing on the physical and social environment.
320. ENERGY MANAGEMENT IN THE HOSPITALITY INDUSTRY (3:3:0) Principles governing energy usage and costs in heating, plumbing, refrigeration, air conditioning, and other equipment in hospitality operations. Prerequisite: H.R.&I.M. 295.

## **HUMAN DEVELOPMENT (H DEV)**

100. INTRODUCTION TO HUMAN DEVELOPMENT (1:1:0) Human development as a process of man-environment transactions, and the relationships of various fields to the study of that process.
101. HUMAN GROWTH AND DEVELOPMENT (3:3:0) Factors affecting human development, health, and behavior over the life-span: biological, environmental, psychosocial, community, and historical.
102. POLICY AND PLANNING FOR HUMAN DEVELOPMENT (3:3:0) Multidisciplinary analysis of concepts and practice in the creation and administration of social interventions for human development.
200. EMPIRICAL INQUIRY IN HUMAN DEVELOPMENT (3:3:0) Introduction to methods and philosophy of empirical inquiry applied to problems of human development.
395. FIELD PROJECTS (1-12) Independent study and research in a human service program; written and oral summary of rationale, procedures, findings.

## **HUMANITIES (HUMAN)**

1. VALUES OF THE WESTERN CULTURAL HERITAGE (3:3:0) Fundamental values of human experience as expressed in outstanding philosophical and literary works.
2. SHAPING OF THE MODERN MIND (3:3:0) Relevance to the present age of influential literary and philosophical texts illustrative of the principal epochs of Western civilization.
21. IDEAS AND ARTS (3:3:0) Interaction of intellectual and aesthetic values from the Renaissance to the present.
50. THE LITERATURE AND LORE OF MINING (3:3:0) Experience and values of mining tradition: survey of the literature and lore, including field experience.
101. MODERN SCIENCE AND HUMAN VALUES (3:3:0) Relationships of science to the aspirations, values, and arts of man.

## **INDIVIDUAL AND FAMILY STUDIES (I F S)**

16. EFFECTIVE INTERPERSONAL SKILLS (1:1:0) Training in interaction skills required for the development and maintenance of satisfying interpersonal relationships.
129. INTRODUCTION TO INDIVIDUAL AND FAMILY DEVELOPMENT (3:3:0) Introduction to psychosocial and family development at all stages of the individual and family life cycle.
319. FAMILY FINANCIAL MANAGEMENT (3:3:0) How families plan their finances and factors that determine their decisions.
329. INFANCY AND EARLY CHILDHOOD (3:3:0) Theories, research findings, and methods in social/behavioral/biological sciences related to developmental processes and intervention during infancy/early childhood. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.
339. LATER CHILDHOOD AND ADOLESCENCE (3:3:0) Physical growth, development, and maturational processes. Agencies of socialization and adjustment systems in development, age six through adolescence. Prerequisite: I.F.S. 129 or Soc. 1 or Psy. 2.

349. **ADULT DEVELOPMENT AND AGING (3:3:0)** Physiological, psychological, and social development and change from young adulthood through old age; characteristic problems of the individual. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.

## **INDUSTRIAL ENGINEERING (I E)**

315. **INDUSTRIAL ORGANIZATION AND ADMINISTRATION (3:3:0)** Fundamental principles of organization leading to intelligent appreciation of the simpler problems of factory organization and operation. Students registered in Industrial Engineering may not schedule this course.

## **INDUSTRIAL ENGINEERING TECHNOLOGY (I E)**

805. **ECONOMICS OF INDUSTRY (2:2:0)** Internal economics of industrial enterprise, cost factors, and methods of comparing alternate proposals.

809. **INSPECTION AND QUALITY CONTROL (3:2:2)** Inspection methods and procedures and their applications to control and acceptance sampling based on statistical methods. Prerequisite: Math. 807.

811. **MANUFACTURING MATERIALS AND PROCESSES (3:2:2)** Mechanical properties of materials; primary processing methods used in manufacturing, emphasizing ferrous metals, their relationship to other metals and nonmetals.

812. **MANUFACTURING PROCESSES (3:1:6)** Technology related to metal removal, dimensional inspection, metal joining, hot and cold forming heat treating, metal casting, properties of materials. Prerequisite: I.E. 811.

815. **PRODUCTION DESIGN (3:1:4)** The planning, designing, and specifying of both standard and special tools required for the production of manufactured goods. Prerequisites: E.G. 803, I.E. 812.

## **INSURANCE (INS)**

102. **PERSONAL INSURANCE PLANNING (3:3:0)** Introduction to the principles and practices of personal insurance planning. May not be scheduled by College of Business Administration students. Prerequisite: third-semester standing.

301. **RISK AND INSURANCE (3:3:0)** Introduction to the principles and methods of handling business and personal risks; emphasis on insurance techniques. Prerequisite: fourth-semester standing.

800. **INSURANCE PRINCIPLES (3:3:0)** Introductory survey of all lines of insurance for handling business and personal risks.

810. **LIFE INSURANCE (3:3:0)** The life insurance contracts as methods of treating the problems of premature death and superannuation. Prerequisite: Ins. 800.

820. **PROPERTY AND CASUALTY INSURANCE (3:3:0)** Fundamental principles of property and casualty insurance. Prerequisite: Ins. 800.

830. **INSURANCE PRACTICUM (3:3:0)** Practical introduction to insurer operations in company and agency offices. Prerequisite: Ins. 820.

## **INTERNATIONAL BUSINESS (I B)**

862. **INTERNATIONAL BUSINESS (3:3:0)**

## **INTERNATIONAL UNDERSTANDING (INT U)**

200. **INTERNATIONAL UNDERSTANDING AND WORLD AFFAIRS (3:3:0)** Interdisciplinary consideration of international problems, conflict and accommodation; impact of various cultures and ideologies on world affairs and foreign policy. Credit will not be given for both this course and Pl.Sc. 14. Prerequisite: third-semester standing.



## **JOURNALISM (JOURN)**

200. **THE MASS MEDIA AND SOCIETY (3:3:0)** Mass communications in the United States; organization, role, content, and effects of newspapers, magazines, television, radio, books, and films. Not intended for students in the School of Journalism.
800. **HISTORY AND SURVEY OF MASS COMMUNICATIONS (3:3:0)** History and role of mass media and advertising in society; nature of newspaper, magazine, broadcasting, book, and motion picture industries.
801. **BEGINNING NEWS WRITING (3:1:4)** Techniques of news writing with emphasis on organizing the story. Detailed critiques and class discussion of student writing. Prerequisites: Engl. 4, Journ. 800, ability to type.
802. **BEGINNING REPORTING (3:1:4)** The techniques of gathering news; problems of taste, ethics, and legality in reporting the news; community reporting assignments. Prerequisite: Journ. 801.
803. **FUNDAMENTALS OF EDITING (3:1:4)** Techniques of editing material for publication; printing processes; copyreading; headline writing; typography; picture editing; layout; legal and ethical considerations. Prerequisite: Journ. 802.
804. **REPORTING THE COMMUNITY (3:0:9)** Practicum in newspaper reporting, editing, and production. Prerequisite: Journ. 803.
811. **ADVERTISING COPYWRITING (3:1:4)** Techniques of writing advertising headlines and copy, with emphasis on spelling, grammar, and word choice. Detailed critiques of student writing. Prerequisite: Journ. 800.
812. **ADVERTISING LAYOUT (3:1:4)** Print advertisement design and production, including typography, plate making, mat services, shop procedures, etc.; detailed critiques of layouts; field trips. Prerequisite: Journ. 800.
813. **ADVERTISING MEDIA AND CAMPAIGNS (3:1:4)** Media selection and coordination, creative strategy, and campaign execution. Each student plans and produces a complete advertising campaign. Prerequisites: Journ. 811, 812.
814. **NEWSPAPER ADVERTISING (3:0:9)** Management of the newspaper advertising department, advertising sales promotion, preparing the sales presentation, dealing with the advertiser, advertising page make-up. Prerequisite: Journ. 813.
820. **NEWSPAPER MANAGEMENT (3:3:0)** Managing and publishing newspapers in the United States; problems of law, finance, personnel, promotion, technological change, and community service. Prerequisite: Journ. 803 or 813.

## **LABOR STUDIES (L S)**

100. **INDUSTRIAL RELATIONS (3:3:0)** Introductory analysis of the employment relationship and of the interrelated interests of managements, workers, unions, and the public.
102. **THEORIES AND FUNCTIONS OF LABOR ORGANIZATIONS (3:3:0)** Study of the theory and practice of labor organizations: goals, internal structure and operations, and impact on society.
103. **LABOR LAW (3:3:0)** A study of legislation affecting labor organizations and their members.
104. **THE PRACTICE OF COLLECTIVE BARGAINING (3:3:0)** Study of the factors involved in negotiating labor contracts, the issues, processes, bargaining relationships, and public responsibilities facing the parties.
156. **(Hist. 156) HISTORY OF THE AMERICAN WORKER (3:3:0)** A study of the American worker from the preindustrial era to the present.
296. **INDEPENDENT STUDIES (1-18)**

## **LIBRARY STUDIES (L ST)**

110. **INFORMATION ORGANIZATION AND RETRIEVAL (3:2:2)** Information structure and resources related to search and problem-solving procedures to identify, organize, and locate print and nonprint materials. Prerequisite: Engl. 15 or 30.

## MANAGEMENT (MGMT)

100. SURVEY OF MANAGEMENT (3:3:0) Introduction to organizational factors relevant to management processes, including leadership, motivation, job design, technology, organizational design and environments, systems, change. For non-Business students only.

801. PRINCIPLES OF MANAGEMENT (3:3:0) Prerequisite: Mgmt. 100.

802. SUPERVISORY MANAGEMENT (3:3:0) Preparation for supervisory positions in formal organizations. Emphasis placed on the motivational aspects of the supervisor's job. Prerequisite: Mgmt. 100.

## MARKETING (MKTG)

220. PERSONAL SELLING (3:3:0) Principles underlying the sales process and practical application of these principles to selling situations. Studies role of selling in total marketing process. Prerequisite: third-semester standing.

221. CONTEMPORARY AMERICAN MARKETING (3:3:0) Social and economic aspects; movement of goods and services from producers to consumers; analysis of marketing functions, systems, and institutions. Students registered in the College of Business Administration may not schedule this course. Prerequisite: 3 credits in Economics.

801. PRINCIPLES OF MARKETING (3:3:0) Prerequisite: Mktg. 221.

802. PROMOTION MANAGEMENT (3:3:0) The application and management of various forms of persuasive communication with potential customers; personal selling, sales management, advertising, sales promotion. Prerequisite: Mktg. 801.

803. PRINCIPLES OF RETAILING (3:3:0) Introduction to the management of retailing organizations, with emphasis on decision making. Not open to retailing majors.

804. PRINCIPLES OF RETAILING SALESMANSHIP (3:3:0) Principles of selling applied to the retail level of trade; practical application of these principles in various sales situations.

805. RETAILING I (3:3:0) An analysis of the management and merchandising policies of various types of retailing institutions.

806. RETAILING II (3:3:0) Merchandising, promotion, and control policies of retail store management. Prerequisite: Mktg. 805.

807. INTRODUCTION TO MARKETING RESEARCH (3:3:0) Managerial aspects of marketing research, with emphasis on practical details of operating a small-scale project. Prerequisites: Mktg. 221, Q.B.A. 801.

808. PRINCIPLES OF EFFECTIVE PURCHASING (3:3:0) Introduction to the purchasing function in organizations, with emphasis on integration of purchasing activity with other aspects of marketing management. Prerequisite: Mktg. 221.

809. PRODUCT PLANNING AND DEVELOPMENT (3:3:0) Problems faced by the product or branch manager including those of planning, research, and consumer satisfaction. Prerequisite: Mktg. 221.

810. PRINCIPLES OF INDUSTRIAL MARKETING (3:3:0) Introduction to the management of industrial marketing strategy. Emphasizes strategic response to industrial marketing opportunities and response to competition. Prerequisite: Mktg. 221.

## MATHEMATICS (MATH)

4. INTERMEDIATE ALGEBRA (3:3:0) Polynomials, fractions, exponents, radicals, first- and second-degree equations and inequalities, sequences, systems of equations. Limited to students indicating deficiencies on the mathematics (algebra) proficiency examination. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*

5. COLLEGE ALGEBRA I (3:3:0) Polynomial and rational expressions; exponents and radicals; equations and inequalities; functions, relations, and their graphs. Prerequisite: Math. 4 or satisfactory performance on the mathematics (algebra) proficiency examination.

## MATHEMATICS

6. PLANE TRIGONOMETRY (3:3:0) Trigonometric functions; solutions of triangles; trigonometric equations; identities, complex numbers. Prerequisites: Math. 5 or satisfactory performance on the mathematics (algebra) proficiency examination; 1 unit of geometry.
17. FINITE MATHEMATICS (3:3:0) Introduction to logic, sets, probability. Prerequisite: 2 units of high school mathematics.
18. ELEMENTARY LINEAR ALGEBRA (3:3:0) Matrices and vectors; transformations; systems of linear equations; convex sets and linear programming. Prerequisite: 2 units of high school mathematics.
35. GENERAL VIEW OF MATHEMATICS (3:3:0) Survey of mathematical thought in logic, geometry, combinatorics, and chance.
36. INSIGHTS INTO MATHEMATICS (3:3:0) Examples of mathematical thought in number theory, topology, theory of symmetry, and chance. Prerequisite: 1 unit of algebra or Math. 4.
110. TECHNIQUES OF CALCULUS I (4:4:0) Functions, graphs, derivatives, integrals, techniques of differentiation and integration, exponentials, improper integrals, applications. Students may take only one course for credit from Math. 110, 140, and 140A. Prerequisite: Math. 5 or satisfactory performance on the mathematics (algebra) proficiency examination.
111. TECHNIQUES OF CALCULUS II (2:2:0) Analytic geometry, partial differentiation, maxima and minima, differential equations. Prerequisite: Math. 110.
140. CALCULUS WITH ANALYTIC GEOMETRY I (4:4:0) Functions; limits; analytic geometry; derivatives, differentials, applications; integrals, applications. Students may take only one course for credit from Math. 110, 140, and 140A. Prerequisites: Math. 6, 7; or Math. 40; or Math. 41; or satisfactory performance on the mathematics (both algebra and trigonometry) proficiency examination.
141. CALCULUS WITH ANALYTIC GEOMETRY II (4:4:0) Derivatives, integrals, applications; sequences and series; analytic geometry; polar coordinates; partial derivatives. Prerequisite: Math. 140 or 140A.
220. MATRICES (2:2:0) Systems of linear equations; matrix algebra; eigenvalues and eigenvectors; linear systems of differential equations. Prerequisite: Math. 110 or 141.
230. CALCULUS AND VECTOR ANALYSIS (4:4:0) Three-dimensional analytic geometry; vectors in space; partial differentiation; double and triple integrals; integral vector calculus. Students who have passed either Math. 231 or 232 may not schedule Math. 230 for credit. Prerequisite: Math. 141.
231. CALCULUS OF SEVERAL VARIABLES (2:2:0) Analytic geometry in space; differential and integral calculus of several variables. Students who have passed Math. 230 may not schedule this course. Prerequisite: Math. 141.
232. INTEGRAL VECTOR CALCULUS (2:2:0) Multidimensional analytic geometry; potential fields; flux; Green's divergence and Stokes's theorem. Students who have passed Math. 230 may not schedule this course. Prerequisite: Math. 231.
250. ORDINARY DIFFERENTIAL EQUATIONS (3:3:0) First- and second-order equations; numerical methods; special functions; Laplace transform solutions; higher order equations. Students who have passed Math. 251 may not schedule this course for credit. Prerequisite: Math. 141.
251. ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS (4:4:0) First- and second-order equations; numerical methods; special functions; Laplace transform solutions; higher order equations; Fourier series; partial differential equations. Prerequisite: Math. 141.
800. BUSINESS MATHEMATICS (3:3:0) Operations with whole numbers, fractions and mixed numbers, decimals and percent, formulas and equations, percentages and interest, introduction to algebra.
807. TECHNICAL MATHEMATICS (5:5:0) Algebraic expressions, exponents, radicals, equations, graphs, systems of equations, trigonometric functions, solution of right triangles, vectors, complex numbers. Prerequisite: Math. 800 or satisfactory performance on the mathematics proficiency examination.
808. TECHNICAL MATHEMATICS AND CALCULUS (4:4:0) Logarithm, inverse trigonometric functions, trigonometric identities, inequalities, series, limits, differentiation, higher order derivatives, implicit differentiation, applications, indefinite and definite integrals. Prerequisite: Math. 807.



## MECHANICAL ENGINEERING TECHNOLOGY (M E)

800. **MECHANISMS (2:0:4)** Motion in machine elements; strength and properties of materials; design of machine elements. Prerequisite: E.Mch. 811.
805. **KINEMATICS (3:2:3)** Graphical and analytical studies of relative motions, instant centers, velocity and acceleration in plane motions, slider crank mechanisms, cams, gears, gear trains, and flexible connectors. Prerequisites: E.G. 1, E.Mch. 811.
807. **HEAT TRANSFER (3:3:0)** Basic principles of conduction, convection, and radiation, emphasizing practical applications.
810. **PRODUCT DESIGN (3:2:3)** Design of machine elements including levers, bearings, shafts, clutches, springs, and gears; selection of ball bearings and belts; design of small mechanical devices. Prerequisites: E.Mch. 813, M.E. 805.
830. **SELECTED TOPICS IN MECHANICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in mechanical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.
881. **ELEMENTARY THERMO AND FLUID DYNAMICS (4:4:0)** Basic problems in compressible fluid flow. Laws of dynamics and thermodynamics, mechanical properties of fluids, elementary heat transfer. Prerequisite or concurrent: Math. 808, Phys. 150.
882. **AIR RESOURCE MANAGEMENT (2:2:0)** Introduction to air pollution. Pollutants, sources, effects, air monitoring systems, air quality criteria and standards, governmental control programs and procedures.
884. **SAMPLING AND MONITORING PROGRAM (2:0:4)** Instrumentation and site selection, field data acquisition for major air pollutants, data analysis and evaluation.

## METALLURGICAL ENGINEERING TECHNOLOGY (MET E)

800. **METALLURGICAL LABORATORY PRACTICE (4:2:4)** Instruction and practice in various metallurgical techniques. Prerequisite: Chem. 11. Prerequisite or concurrent: Phys. 150.
801. **PRINCIPLES OF EXTRACTIVE METALLURGY (2:2:0)** An introduction to several metals' extraction processes using a problem-solving approach. Prerequisite: Chem. 12.
802. **PHYSICAL METALLURGY (3:2:2)** Structures of metals and alloys; structure manipulations; structure-property relationships. Prerequisites: Chem. 12, Phys. 150, Math. 807, Met.E. 800.
803. **MATERIALS TESTING (3:1:4)** Applications of testing procedures to determine properties of inorganic materials.
804. **FERROUS METALLURGY (3:2:2)** Making, shaping, and heat treatment of cast irons and steels. Prerequisites: Chem. 12, Met.E. 800.
805. **NONFERROUS METALLURGY (3:2:2)** Extraction of nonferrous metals from their ores and subsequent compositional adjustment by refining and alloying. Prerequisites: Chem. 12, Met.E. 800.
806. **SUMMER FIELD PRACTICE (3)** Practical experience in the metallurgical industries.
807. **METALLURGICAL OPERATIONS (1:0:3)** Plant trips to metals industries; classroom discussion with metallurgists concerning their work and the role of the metallurgical associate.

## METEOROLOGY (METEO)

3. **INTRODUCTORY METEOROLOGY (3:2:2)** Nontechnical treatment of fundamentals of modern meteorology; effect of weather and climate on man and his activities. A student who took Meteo. 2 may take this course for 1 credit only.

## MICROBIOLOGY (MICRB)

106. **ELEMENTARY MICROBIOLOGY (2:2:0)** Importance of microorganisms in public health and disease, agriculture and industry; descriptive course for nontechnical students.
107. **ELEMENTARY MICROBIOLOGY LABORATORY (1:0:2)** Selected techniques with regard to



## MINERAL PROCESSING

recognition and enumeration of bacteria; effects of chemical and physical agents on microorganisms. Prerequisite or concurrent: Micrb. 106.

151. SEMINAR AND PRACTICUM FOR MEDICAL LABORATORY TECHNICIANS (2-17 per semester, maximum of 28) Lectures and laboratory sessions introduce methods and procedures, underlying principles, and their applications in clinical practice. Prerequisites: Micrb. 150, 201, 202, Chem. 34, Biol. 41.

*Unit A. Clinical Chemistry* (9) Basic principles and procedures for measuring chemical components of blood and other body fluids.

*Unit B. Clinical Microbiology/Serology* (6) Properties and identification of normal and abnormal microbial flora. Antigen-antibody interactions of diagnostic importance.

*Unit C. Hematology* (6) Red and white blood cell identification and enumeration. Related procedures for diagnosing normal or disease states.

*Unit D. Immunohematology* (5) Immunologic considerations necessary for the transfusion of blood and blood products.

*Unit E. Urinalysis* (2) Identification of cellular and crystalline urinary sediments. Qualitative chemical analysis of urine.

201. INTRODUCTORY MICROBIOLOGY (3:3:0) Elementary principles of microbial and viral interrelationships, morphology, and physiology; relation to food, water, soil, industry, and disease processes. Prerequisite: Chem. 12.

202. INTRODUCTORY MICROBIOLOGY LABORATORY (2:0:4) Qualitative and quantitative techniques with regard to recognition of bacteria and their processes on a microscopic, colonial, and physiological basis. Prerequisite or concurrent: Micrb. 201. Prerequisite: Chem. 12.

## MINERAL PROCESSING (MN PR)

61. INTRODUCTION TO COAL PREPARATION (3:3:0) Theory and application of modern coal preparation practice. Sampling, crushing, sizing, gravity concentration, flotation, dewatering, drying; pollution control; flowsheets.

## MINING (MNG)

23. MINERAL LAND AND MINE SURVEYING (3:0:9) Surveying theory and practice applied to mineral lands and mines; traversing, leveling, mapping, shaft plumbing; stope, room, and development surveying. Prerequisites: E.G. 11, ½ unit of secondary school trigonometry.

30. INTRODUCTION TO MINING ENGINEERING (3:2:3) Examination, development, and exploitation of mineral deposits in case studies of mineral deposits and mines; unit operations, cycling, equipment, methods.

## MINING TECHNOLOGY (MNG T)

800. MINING TECHNOLOGY ORIENTATION (1:0:2) Films, slides, and lectures to acquaint the student with the coal mining industry and its impact on society.

801. COAL MINING TECHNOLOGY (3:2:3) Analysis of coal mining systems; integration of unit operations and mining methods for efficient mine production.

802. MINE VENTILATION (3:2:3) Quality and quantity analysis and control of mine atmosphere. Prerequisite or concurrent: Chem. 11, Phys. 150, Mng.T. 801.

803. STRATA CONTROL (3:2:3) Fundamentals of stresses and strains in rocks; virgin and concentrated stresses; roof support, subsidence, bursts, and stability control. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Mng.T. 801.

804. MINE PLANT TECHNOLOGY (3:2:3) Electrical systems in mines; mechanical power applications and materials handling systems. Prerequisite: Phys. 150.

805. MINE SYSTEMS TECHNOLOGY (3:2:3) Quantitative methods of work measurement and their application to production and method study problems related to mines. Prerequisite: Mng.T. 801.

806. MINE MANAGEMENT AND LAW (3:3:0) The problems of the individual in coal mine management in relation to environment, employer, union, and law.

807. **ELECTRICAL MINE MACHINE CIRCUITS (3:2:3)** Topics of electrical power fundamentals, power and control circuits, motors and their mine applications will be covered. Prerequisite: Mng.T. 804.

808. **MINE POWER DISTRIBUTION (3:2:3)** Topics of high voltage circuits, underground transmission, power stations, power conversion, safety regulations, and power devices will be covered. Prerequisite: Mng.T. 804.

809. **MINE MACHINERY HYDRAULICS (3:2:3)** Topics of basic hydraulic principles and their application to mining and mine machinery will be covered. Prerequisites: Math. 807, Phys. 150.

810. **MINE MACHINE DYNAMICS (3:2:3)** Topics on basic machines and their application to the principles of mine machine operation will be covered. Prerequisites: E.Mch. 811, Phys. 150.

811. **PRACTICUM IN MINE MAINTENANCE (3:0:9)** Field and shop techniques in procedures of electrical, mechanical, and hydraulic phases of mine maintenance will be covered. Prerequisites: Mng.T. 804, Phys. 150.

815. **SURFACE MINING TECHNOLOGY (3:2:3)** Analysis of surface mining systems; integration of unit operations and equipment utilization for efficient operation. Prerequisite: Mng.T. 800.

816. **ELEMENTS OF SURFACE MINE DESIGN (3:2:3)** Exploration methods, pit planning, and design; drilling and fragmentation; loading and haulage systems; and slope stability. Prerequisite: Mng.T. 815.

817. **SURFACE MINING PRODUCTION TECHNOLOGY (3:2:3)** Application of time study and work measurement to surface production. Efficiency of equipment usage and equipment utilization scheduling. Prerequisite: Mng.T. 815.

818. **SURFACE MINING HYDROLOGY (3:3:0)** Water control and treatment; hydrologic studies before and after mining; impoundments and water treatment. Prerequisites: Chem. 11; Geosc. 1 or 20 or 101.

819. **RECLAMATION TECHNOLOGY (3:3:0)** Spoil-bank reclamation and contour grading; revegetation and reclaimed land utilization.

## MUSIC (MUSIC)

5. **THE FUNDAMENTALS OF MUSIC APPRECIATION (3:3:0)** Recitation and lectures with recorded examples of melody, harmony, rhythm, vocal and instrumental timbre, form, and program and absolute music.

8. **RUDIMENTS OF MUSIC (3:3:0)** Introduction to the elements of music: notation, scales, meter, rhythm, intervals; basic chord structure. For non-Music majors.

## MUSIC EDUCATION (MU ED)

806. **MUSIC SKILLS FOR RECREATION LEADERS (3:3:0)** Theories and practice in music activities found in group and club settings. Appreciation, leadership techniques, and fundamental musicology.

## NUCLEAR ENGINEERING TECHNOLOGY (NUC E)

800. **NUCLEAR AND ATOMIC SCIENCE (2:2:0)** Introduction to the theories of atomic and nuclear structure and electromagnetic radiation. Prerequisite or concurrent: Math. 808, Phys. 151.

801. **RADIOLOGIC SAFETY (2:2:0)** Discussion of basic radiation dose units, radiation monitoring techniques, biological effects of radiation, and AEC regulations. Prerequisite or concurrent: Nuc.E. 800.

802. **ELEMENTS OF NUCLEAR TECHNOLOGY (4:4:0)** Atomic and nuclear structure, electromagnetic radiation, nuclear radiations, nuclear interactions, neutron diffusion, and reactor materials. Prerequisites: Math. 808, Phys. 151.

803. **ELEMENTS OF NUCLEAR POWER GENERATION (3:3:0)** Survey of various reaction types with emphasis on fuel heat removal and power generation, shielding, fuel fabrication and reprocessing. Prerequisite: Nuc.E. 802.

## NUTRITION

804. INTRODUCTION TO REACTOR TECHNOLOGY (3:3:0) Steady state reactor theory, kinetic behavior of reactors and reactor control systems. Prerequisite: Nuc.E. 802.
805. PRINCIPLES OF MEASUREMENT (3:2:2) A study of measurement in the nuclear industry, including the instruments used, accuracy of measurement, and statistical justification. Prerequisites: E.E. 814, Phys. 151.
812. NUCLEAR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of radiation measurements and the diversified application of nuclear techniques. Prerequisites: Nuc.E. 801, 802.
814. REACTOR TECHNOLOGY LABORATORY (3:1:4) Laboratory study of basic reactor experiments, control rod calibration, critical experiment, etc. Emphasis placed upon reactor operations. Must be taken with Nuc.E. 804. Prerequisite: Nuc.E. 801.
820. ELECTRICAL GENERATION ORIENTATION (1:1:0) Introduction and comparison of methods of generating electricity; description of the variety of occupations in the electrical generating industry.
821. INTRODUCTORY BOILING WATER REACTOR TECHNOLOGY (1:1:0) Introduction to the concept of commercial power generation of electricity through the use of a boiling water reactor.
822. POWER PLANT QUALITY ASSURANCE/QUALITY CONTROL (1:1:0) Introduction to concepts of quality assurance/quality control; historical development of standards and regulatory guides; specific applications to nuclear plants.
830. SELECTED TOPICS IN NUCLEAR ENGINEERING TECHNOLOGY (3) Individual or group work in nuclear engineering technology for students with specific occupational objectives. Prerequisite: third-semester standing.

## NUTRITION (NUTR)

150. ELEMENTARY NUTRITION (2:2:0) Fundamentals of nutrition and its relation to human health. Students who have passed Nutr. 251 may not schedule this course.
251. INTRODUCTORY PRINCIPLES OF NUTRITION (3:3:0) The nutrients: food sources and physiological functions as related to human growth and well-being throughout life; current nutrition issues. Students who have passed Nutr. 150 may not schedule this course.
801. NUTRITION COMPONENT OF THE FOOD SERVICE SYSTEM (3:3:0) Introduction to basic nutrition principles and their application in a food service system.

## PHILOSOPHY (PHIL)

1. CRITICAL THINKING AND ARGUMENT (3:3:0) Principles of correct thinking; deductive and inductive inference; use and misuse of language in reasoning.
2. EXISTENTIALISM (3:3:0) Exploration of a controversial modern mode of philosophizing about life, death, absurdity, and faith.
3. ETHICS AND SOCIAL ISSUES (3:3:0) Ethical issues such as war, privacy, crime and punishment, racism and sexism, civil liberties, affirmative action, abortion, and euthanasia.
4. BASIC PROBLEMS OF PHILOSOPHY (3:3:0) Issues such as the foundations of knowledge, the existence of God, the problem of freedom, and the nature of reality.
12. ELEMENTS OF SYMBOLIC LOGIC (3:3:0) Translating arguments into symbolic form and establishing validity. For nonscience majors.
100. THE MEANING OF HUMAN EXISTENCE (3:3:0) A study of philosophical ways of viewing the purpose of life, the good life, and history and its meaning.
103. MORAL VALUE (3:3:0) Freedom, choice, and obligation in conduct; values and the foundations of ethics.
104. ETHICS AND THE PROFESSIONS (3:3:0) The philosophical basis for the ethics of professional practice; illustrations include law, business, public administration, journalism, engineering, teaching, medicine.
105. INTRODUCTION TO THE PHILOSOPHY OF LAW (3:3:0) Topics normally include concepts of law and responsibility, justice and punishment, legal ethics, and the limits of law.
106. BUSINESS ETHICS (3:3:0) A study of ethical issues which confront the business community. Designed primarily for majors in the College of Business Administration.



108. **SOCIAL AND POLITICAL PHILOSOPHY (3:3:0)** Philosophical analysis of political and communal order; theories of individual and group action within the structures of social obligation.
111. **ORIENTAL PHILOSOPHY (3:3:0)** Study of philosophical, aesthetic, and religious ideas in the classics of Eastern thought.
212. **SYMBOLIC LOGIC (3:3:0)** The logic of propositions, relations, and quantification; the nature and properties of formal systems. Intended primarily for science-oriented students.

## PHYSICAL EDUCATION (PH ED)

5. **PHYSICAL EDUCATION (1:0:3 per semester)** Full-semester activity courses to develop physical and recreational skills. Selection from aerobic dance, cross-country skiing, dancing, field hockey, golf, jogging, lacrosse, orienteering, outdoor living skills, personal fitness, sailing, scuba, strength training, tennis, and others.
6. **PHYSICAL EDUCATION (½:0:3 per first half of semester)** Activity to develop physical and recreational skills. Selection from archery, badminton, basketball, bowling, canoeing, fencing, figure skating, handball, hunter safety, racquetball, riflery, squash, swimming, volleyball, and others. First half semester course.
7. **PHYSICAL EDUCATION (½:0:3 per second half of semester)** See description for Ph.Ed. 6. Second half semester course.
9. **LIFE SAVING AND WATER SAFETY (1:0:3)** Course outlined by the American Red Cross; prepares the student for the Senior Life Saving examination. Prerequisite: passing of qualifying swimming test.
11. **WATER SAFETY INSTRUCTOR (1:0:3)** The American Red Cross aquatic instructor's course, including swimming, diving, life saving, water safety. Prerequisite: students wishing to take instructor's examination must have a recent Red Cross Senior Life Saving certificate.

## PHYSICAL SCIENCE (PH SC)

7. **PHYSICAL SCIENCE (3:3:0)** Development of physics, including modern physical concepts and their relationship to the careers of physical scientists. May not be scheduled by students who have received credit for Phys. 100, 201, 215, or 221.
8. **PHYSICAL SCIENCE (3:3:0)** Selected concepts of chemistry showing their development, interrelationship, and present status. May not be scheduled by students who have received credit for Chem. 11 or 12.

## PHYSICIAN'S ASSISTANT (P A)

800. **BASIC MEDICAL AND CLINICAL SCIENCES I (7:7:0)** Introduction to principles of the basic and clinical sciences related to providing care to patients in a primary-care setting.
801. **BASIC MEDICAL AND CLINICAL SCIENCES II (7:7:0)** Continuation of P.A. 800. Principles of the basic and clinical sciences related to providing care to patients in a primary-care setting. Prerequisite: P.A. 800.
805. **MICROBIOLOGY (1:1:0)** Introduction to the principles of clinical microbiology useful to a physician's assistant functioning in a primary-care setting.
810. **HUMAN BEHAVIOR (3:3:0)** Introduction to the principles of psychiatry and behavioral medicine relevant to medical care in the primary-care setting.
820. **PATIENT-ORIENTED CARE I (3:2:8)** Introduction of a comprehensive approach to care of the patient in the family context.
821. **PATIENT-ORIENTED CARE II (3:2:8)** Continuation of P.A. 820. Introduction to patient and family care in the context of health care systems. Prerequisite: P.A. 820.
840. **CLINICAL SKILLS FOR PHYSICIAN'S ASSISTANT I (2:1:4)** Technical skills development necessary to prepare the student in the clinical skills areas required during the primary health care practicum.
841. **CLINICAL SKILLS FOR PHYSICIAN'S ASSISTANT II (2:1:4)** Continuation of P.A. 840. Technical skills development necessary to prepare the student in the clinical skills areas required during the primary health care practicum. Prerequisite: P.A. 840.



## PHYSICS

850. THERAPEUTICS (3:3:0) Introduction to basic applied clinical pharmacology with emphasis on chemical therapeutic agents commonly used with primary-care patients.
870. PEDIATRICS (1:1:0) Introduction to the principles of pediatric primary care.
871. GERIATRICS (1:1:0) Introduction to the unique social, psychological, and medical-surgical problems of the aging patient.
878. CATEGORICAL EXPERIENCES (9:0:40) Clinical rotations in categorical areas appropriate to physician's assistant clinical skills development.
880. PRACTICUM IN PRIMARY HEALTH CARE DELIVERY I (15:0:40) Preceptorship with primary-care physician. Emphasis on health appraisal, evaluation of patient problems, and implementation of care. Prerequisite: P.A. 878.
881. PRACTICUM IN PRIMARY HEALTH CARE DELIVERY II (15:0:40) Continuation of P.A. 800. Preceptorship with primary-care physician. Emphasis on health appraisal, evaluation of patient problems, and implementation of care. Prerequisite: P.A. 800.

## PHYSICS (PHYS)

150. TECHNICAL PHYSICS (3:2:2) Elementary treatment of topics in mechanics, heat, wave motion, and sound leading toward an understanding of technical applications. Prerequisite: 1½ units of algebra. Prerequisite or concurrent: Math. 801.
151. TECHNICAL PHYSICS (3:2:2) Elementary treatment of topics in electricity, light, and modern physics leading toward an understanding of technical applications. Prerequisite: Phys. 150.
201. GENERAL PHYSICS (4:4:0) Mechanics. Concurrent: Math. 140.
202. GENERAL PHYSICS (4:3:2) Electricity and magnetism. Prerequisite: Phys. 201. Concurrent: Math. 141.
203. GENERAL PHYSICS (3:3:0) Wave motion and thermodynamics. Prerequisite: Phys. 202.
204. GENERAL PHYSICS (4:3:2) Wave motion and thermodynamics, with laboratory. Prerequisite: Phys. 202.
215. INTRODUCTORY PHYSICS (4:3:2) Selected topics in mechanics, heat, and sound. Prerequisite: algebra to quadratics.
237. INTRODUCTION TO QUANTUM PHYSICS (3:3:0) Relativity and quantum theory applied to selected topics in atomic, molecular, solid state, and nuclear physics. Concurrent: Phys. 203 or 204.
265. INTRODUCTORY PHYSICS (4:3:2) Selected topics in light, electricity, and magnetism. Prerequisite or concurrent: Phys. 215.
297. SPECIAL TOPICS (1-9)

## POLITICAL SCIENCE (PL SC)

1. AMERICAN NATIONAL GOVERNMENT (3:3:0) Development and nature of American political culture; constitutional and structural arrangements; policy-making processes; sources of conflict and consensus.
2. AMERICAN PUBLIC POLICY (3:3:0) Examination of selected areas of public policy in America. Analysis of policy content, alternatives, and impact. Prerequisite: Pl.Sc. 1.
3. GOVERNMENT AND POLITICS IN MODERN SOCIETY (3:3:0) Introduction to study of government and politics. Normative and empirical theories; governmental functions in modern communities; representative structures and processes.
14. INTERNATIONAL RELATIONS (3:3:0) Characteristics of modern nation-states and forces governing their international relations; nationalism; imperialism; diplomacy; current problems of war and peace. Credit will not be given for both this course and Int.U. 200.
20. COMPARATIVE POLITICS—WESTERN EUROPE (3:3:0) Comparative analysis of political cultures, interest groups, parties, and decision-making processes in principal Western European political systems.

## PSYCHOLOGY (PSY)

2. PSYCHOLOGY (3:3:0) Introduction to general psychology; principles of human behavior and their applications.
15. ELEMENTARY STATISTICS IN PSYCHOLOGY (4:3:2) Frequency distributions and graphs; measure of central tendency and variability; normal probability curve; elementary sampling and reliability; correlations; simple regression equations. Prerequisites: Psy. 2; Math. 5 or 2 units of secondary school algebra.
21. CURRENT APPLICATIONS OF PSYCHOLOGY (3:3:0) Topics may be drawn from but not limited to opinion research, selection and placement, behavior modification, attitude measurement and change. Prerequisite: Psy. 2.
37. MENTAL HEALTH (3:3:0) Maintaining adjustment, developing a well-balanced personality; behavior disorders and their treatment. May not be used as a prerequisite for any course in Psychology. Not open to Psychology majors or those who have credit for Psy. 437.
170. PSYCHOLOGY OF WOMEN (3:3:0) Psychology of women in historical perspective and present involvement. Stresses women's self-concepts with relation to individual and social psychological health. Prerequisite: Psy. 2.
174. (Soc. 174) PSYCHOLOGICAL AND SOCIOLOGICAL ASPECTS OF DEATH (3:3:0) An introductory, interdisciplinary approach to the psychology and sociology of death, stressing the significance of, and attitudes toward, mortality. Prerequisites: Psy. 2, Soc. 1.
202. INTRODUCTION TO PERCEPTION (3:3:0) Survey of human perception and processing of perceptual information, with some reference to animal literature. Emphasizes vision and audition. Prerequisite: Psy. 2.
203. NEUROLOGICAL BASES OF HUMAN BEHAVIOR (3:3:0) An introduction to biopsychology, emphasizing the structure and function of the human brain.
204. INTRODUCTION TO LEARNING (3:3:0) A general survey of the learning area, including animal and human experiments, with the applicability of learning principles being discussed. Prerequisite: Psy. 2.
213. INTRODUCTION TO DEVELOPMENTAL PSYCHOLOGY (3:3:0) Developmental principles; physical growth; linguistic, intellectual, emotional, and social development from infancy to maturity. Prerequisite: Psy. 2.
221. INTRODUCTION TO COGNITIVE PSYCHOLOGY (3:3:0) Introduction to study of such higher mental processes as thinking and reasoning, imagery, concept formation, problem solving, and skilled performance. Prerequisite: Psy. 2.
296. INDEPENDENT STUDIES (1-18)

## QUANTITATIVE BUSINESS ANALYSIS (Q B A)

101. INTRODUCTION TO QUANTITATIVE BUSINESS ANALYSIS (3:3:0) Introduction to quantitative methods for conceptualizing business and management problems. Prerequisite: Math. 18 or 110.
102. ELEMENTARY BUSINESS STATISTICS (3:3:0) Statistical inference; estimation, hypothesis testing, testing, correlation, and regression; application of statistical techniques to economic and business problems. Prerequisite: Q.B.A. 101.
801. ELEMENTARY BUSINESS STATISTICS (3:3:0) Collection, tabulation, measurement, presentation, and interpretation of quantitative material. Prerequisite: third-semester standing.

## RADIOLOGIC TECHNOLOGIST RADIOGRAPHER (R T R)

1. HISTORY OF RADIOLOGY; ELEMENTARY RADIATION PROTECTION; MEDICAL ETHICS (1:2:6) History of radiology field, basic principles of radiation protection, applications of medical ethics, base office procedures, departmental structure.
20. MEDICAL TERMINOLOGY; RADIOGRAPHIC POSITIONING I (1:3:5) Introduction to the medical profession's language; basic positional terminology, emphasis on skeletal positioning with skull introduction.

## READING, COMMUNICATION, AND LANGUAGE EDUCATION

30. RADIOGRAPHIC EXPOSURE I; FILM CRITIQUE I (1:3:5) Preliminary exposure factors concerning radiographic imaging; evaluation of radiographic films.
40. RADIOGRAPHIC POSITIONING II: CONTRAST PROCEDURES; NURSING PROCEDURES (5:3:13) Body system positionings, radiologic applications on contrast media, nursing procedures pertinent to radiologic technology. Prerequisite: R.T.R. 20.
50. RADIOGRAPHIC EXPOSURE II (1:2:5) Emphasis on problem solving and formation of technique chart. Prerequisite: R.T.R. 30.
60. DARKROOM CHEMISTRY; FILM CRITIQUE II (1:3:5) Film composition, manifestation of latent image and film processing techniques; continuation evaluation of radiographic films. Prerequisites: Chem. 11, R.T.R. 30.
70. RADIOGRAPHIC POSITIONING III (1:2:6) Review of skeletal, skull, and body systems; emphasis on pediatric, geriatric, psychiatric, and intra-oral radiography. Prerequisite: R.T.R. 40.
80. SPECIAL PROCEDURES; REGISTRY REVIEW (1:5:14) Invasive contrast procedures pertinent to radiology. Tomography, paradiologic imaging modalities; review for registry examination. Prerequisite: R.T.R. 70.
90. MEDICAL AND SURGICAL DISEASES; REGISTRY REVIEW II (1:3:14) Review of registry examination, definition of various diseases, and pathology pertaining to bodily systems. Prerequisites: Biol. 41, R.T.R. 80.

## READING, COMMUNICATION, AND LANGUAGE EDUCATION (RCLED)

5(A,B). COLLEGE READING SKILLS IMPROVEMENT (2-4) Improving reading comprehension, vocabulary, rate, study skills, and integrating these more efficiently in course work.

*Unit A:* Average or better readers seeking advanced work or preparation for specific goals.

*Unit B:* Limited to students needing developmental reading instruction and recommended on the basis of reading entrance test scores.

## REAL ESTATE (R EST)

301. REAL ESTATE PRINCIPLES (3:3:0) Introduction to urban real estate; economic forces affecting property rights; real estate markets and finance; land-use analysis; government policies.
800. REAL ESTATE PRINCIPLES (3:3:0) Nature of the real estate market; introduction to the functions performed in the real estate business.
810. REAL ESTATE SALES (3:3:0) Principles underlying the sale of real estate; the use of selling tools and procedures in the analysis of customers' needs.
830. REAL ESTATE FINANCE (3:3:0) Basic principles of real estate finance; sources of funds for financing real estate.

## RELIGIOUS STUDIES (RL ST)

1. INTRODUCTION TO THE STUDY OF RELIGION (3:3:0) An historical and comparative survey of the principal beliefs and practices of the world's major religions.
19. RELIGION IN AMERICAN LIFE AND THOUGHT (3:3:0) The function, contributions, tensions, and perspectives of religion in American culture.

## RETAILING (RTL)

840. MANAGEMENT IN THE HOME (3:3:0) The principles of decision making, work simplification, use of equipment, and home safety applied to family management.
850. DISPLAY TECHNIQUES (2:1:3) Display as visual communication, emphasizing the techniques related to merchandising and art. Prerequisite: an art or art appreciation course.



## SCIENCE, TECHNOLOGY, AND SOCIETY (S T S)

100. THE ASCENT OF MAN (3:3:0) A survey of some of the intellectual achievements which highlight mankind's attempts to understand nature and shape the environment.

## SOCIAL SCIENCE (SO SC)

1. THE URBANIZATION OF MAN: A SOCIAL SCIENCE PERSPECTIVE (3:3:0) An overview of the social sciences, including an interdisciplinary analysis of the urban process.

2. CONTEMPORARY MAN AND SOCIETY (3:3:0) Selected contemporary issues in the perspective of history, sociology, psychology, economics, and political science.

110. INTRODUCTION TO CONTEMPORARY AFRICA (3:3:0) Consideration of influences and forces at work; leaders, elites, and groups. Analysis of problems and issues in Africa.

## SOCIOLOGY (SOC)

1. INTRODUCTORY SOCIOLOGY (3:3:0) The nature and characteristics of human societies and social life.

3. INTRODUCTORY SOCIAL PSYCHOLOGY (3:3:0) The impact of the social environment on perception, attitudes, and behavior.

5. SOCIAL PROBLEMS (3:3:0) Current social problems such as economic, racial, and gender inequalities; social deviance and crime; population, environmental, energy, and health problems.

7. INTRODUCTION TO SOCIAL RESEARCH (3:3:0) Fundamental concepts and problems in social science research; design, measurement, sampling, causation, validity, interpretation. Prerequisite: 3 credits in Sociology.

15. URBAN SOCIOLOGY (3:3:0) City growth and decline; impact of city life on individuals, families, neighborhoods, and government; urban life-styles.

30. SOCIOLOGY OF THE FAMILY (3:3:0) Family structure and interaction; functions of the family as an institution: cross-cultural comparisons.

## SOLAR TECHNOLOGY (S T)

801. INTRODUCTION TO SOLAR TECHNOLOGY (2:1:2) Introduction to solar technology from the standpoint of history, ecology, and energy.

804. ANALYSIS OF SOLAR HEATING AND COOLING SYSTEMS (3:1:5) Comprehensive analysis and application of solar heating and cooling systems. Calculations and layout. Prerequisite: fourth-semester standing.

806. PASSIVE SYSTEMS AND CONSERVATION METHODS (3:3:0) Passive concepts and designs; earth sheltering; energy audits and conservation techniques; wood burning equipment.

807. LIQUID SPACE HEATING AND DOMESTIC HOT WATER SYSTEMS (3:2:2) Liquid collectors, storage, and domestic hot water systems; pumps and piping; heat exchangers; fluid and component selection; power and controls. Prerequisites: S.T. 801, M.E. 881.

808. AIR SYSTEMS AND CONVENTIONAL HEATING EQUIPMENT (3:2:2) Air collector and storage systems; fans and ductwork; heat exchange coils; controls; conventional-fired equipment operation. Concurrent: S.T. 807.

809. Nontechnical Aspects of Solar Technology (3:2:2) System sizing with f-chart method; economic analysis techniques; cost estimating; job scheduling; legal aspects; warranties; solar cooling methods and economics. Prerequisite: S.T. 801.

830. SELECTED TOPICS IN SOLAR HEATING AND COOLING TECHNOLOGY (3) Individual or group work in solar heating and cooling technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.



## SPANISH (SPAN)

1. ELEMENTARY SPANISH (4:3:2) Audio-lingual approach to basic Spanish; writing.
2. ELEMENTARY SPANISH (4:3:2) Audio-lingual approach to basic Spanish continued; writing. Prerequisite: Span. 1.
3. INTERMEDIATE SPANISH (4:3:2) Audio-lingual review of structure; writing; reading. Prerequisite: Span. 2.
10. INTENSIVE SPANISH (6:5:2) Basic Spanish grammar; oral, aural, and writing skills. Essentially equivalent to Span. 1, 2, 3, but in accelerated five period per week module.
20. INTENSIVE SPANISH (6:5:2) Continuation of Span. 10. Prerequisite: Span. 10.
130. IBERIAN CIVILIZATION (3:3:0) Spanish and Portuguese life from the medieval period to the present; literature, the arts, and contemporary problems in historical perspective.
131. IBERO-AMERICAN CIVILIZATION (3:3:0) Spanish American and Brazilian life from the Conquest to the present: literature, art, the indigenous heritage, and contemporary problems.
230. MASTERPIECES OF SPANISH LITERATURE IN ENGLISH TRANSLATION (3:3:0) Emphasis on works and authors of international importance. Lectures, readings, and written work in English.
231. MASTERPIECES OF SPANISH AMERICAN LITERATURE IN ENGLISH TRANSLATION (3:3:0) Emphasis on works and authors of international importance. Lectures, readings, and written work in English.

## SPEECH COMMUNICATION (SPCOM)

100. EFFECTIVE SPEECH (3:3:0) Introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.
  - Unit A.* Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation.
  - Unit B.* Principles of communication, implemented through group problem solving, with some attention to formal speaking and message evaluation.
  - Unit C.* Principles of communication, implemented through analysis and evaluation of messages, with some attention to formal speaking and group discussion.
240. FOUNDATIONS OF TELECOMMUNICATIONS (3:3:0) Examination of oral, scribal, print, industrial, and electronic cultures; analysis of impact of technology on communications and social structure.
295. INTERNSHIP (1-16) Supervised nongroup instruction, including field experiences, practicum, or internships. Written and oral critique of activity required. Prerequisite: prior approval of proposed assignment by instructor.
296. INDEPENDENT STUDIES (1-18)
335. INTRODUCTION TO AUDIO AND VIDEO COMMUNICATIONS (3:2:2) Introduction to audio and video studio procedures and techniques within the context of human communication.
340. THEORY AND TECHNIQUES OF AUDIO PRODUCTION (3:2:2) Intermediate course; audio in human communication; comparison of audio forms; development of production skills; aesthetic interpretation of production. Prerequisite: Sp.Com. 335.
345. THEORY AND TECHNIQUES OF VIDEO PRODUCTION (3:2:2) Intermediate level; video in human communication; organizational structure of video systems; production, analytical skills for mass and submass audience presentations. Prerequisite: Sp.Com. 335.
380. ORAL INTERPRETATION (3:3:0) Principles of oral interpretation of the printed page with practice in oral reading of poetry, prose, and drama.

## STATISTICS (STAT)

200. ELEMENTARY STATISTICS (4:3:2) Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. Prerequisite: 2 units in algebra.
318. ELEMENTARY PROBABILITY (3:3:0) Combinatorial analysis, axioms of probability, conditional probability and independence, discrete and continuous random variables, expectation, limit theorems, additional topics. Prerequisite: Math. 142.

## TELECOMMUNICATIONS (TELCM)

840. **INTRODUCTION TO TELECOMMUNICATIONS SYSTEMS (1:1:0)** Elements of telecommunications systems including telephones, transmission lines, switching, digital data, and transmission by microwave, satellite, and fiber optics.
841. **SWITCHING AND TRAFFIC (3:3:0)** Routing of telecommunications messages: characteristics, methods, and control. Prerequisite: Telcm. 840.
842. **SWITCHING AND TRAFFIC LABORATORY (1:0:2)** Measuring equipment for telecommunications systems. Prerequisite or concurrent: Telcm. 841.
843. **TRANSMISSION (3:3:0)** Transmission of telecommunications information, including design problems. Prerequisite: Telcm. 840.
844. **TRANSMISSION LABORATORY (1:0:2)** Installation, alignment, and operation of telecommunication equipment. Prerequisite or concurrent: Telcm. 843.

## THEATRE ARTS (THEA)

100. **THE ART OF THE THEATRE (3:3:0)** Survey of the history, craft, and art of the theatre to support an informed appreciation of theatrical events.
102. **FUNDAMENTALS OF ACTING (3:3:0)** Introduction to performance skills for the student with a general interest in acting.
103. **FUNDAMENTALS OF DIRECTING (3:3:0)** Training and experience in basic skills of directing. Designed for non-Theatre majors.
104. **FUNDAMENTALS OF THEATRE PRODUCTION (3:3:0)** Training and experience in basic skills of technical theatre. Designed for non-Theatre majors.
109. **THE DRAMATIC ARTS IN THE MASS MEDIA (3:3:0)** The place of television-radio-film drama in our culture; relationship with other art forms; standards of evaluation.
210. **INTRODUCTION TO CREATIVE DRAMATICS (3:1:4)** Introduction and direct experience in creative dramatics and survey of children's theatre.
296. **INDEPENDENT STUDIES (1-18)**

## WILDLIFE (WILDL)

801. **INTRODUCTION TO WILDLIFE MANAGEMENT (3:3:0)** Basic principles of wildlife management. Introduction to general ecology and wildlife population dynamics.
802. **RECONNAISSANCE SURVEYS (3:2:3)** Use of topographic maps and hand-held compasses; survey methods using the staff compass, abney level, steel tape, and pacing. Reconnaissance mapping.
803. **ANIMAL IDENTIFICATION (3:2:3)** Identification of mammals, birds, reptiles, amphibians, and fishes; introduction to their life histories.
804. **WILDLIFE MENSURATION (3:3:0)** Estimation and analysis of animal populations, including sampling considerations and basic biometry. Prerequisite: 3 credits in mathematics.
805. **FIELD AND LABORATORY TECHNIQUES (3:2:8)** Techniques used in wildlife research and management. Prerequisites: Wildl. 801, 802, 803, For. 203. Concurrent: Wildl. 806.
806. **OPERATIONAL PROCEDURES AND EQUIPMENT (2:2:6)** Operational procedures for wildlife-related equipment and facilities; field trips to wildlife management areas. Concurrent: Wildl. 805.
807. **OUTDOOR RECREATION (3:2:3)** Sociology, history, and economics of recreational demand; recreational areas and management procedures.
808. **TERRESTRIAL WILDLIFE MANAGEMENT (3:1:6)** Ecological characteristics and manipulation of terrestrial habitats; control of wildlife populations. Prerequisites: Wildl. 801, 802, 803, 804, For. 203, 240.
809. **ANIMAL HANDLING AND CARE (3:2:3)** Techniques in capturing, marking, and maintaining wild animals in captivity. Necropsy procedures to determine physical condition and cause of death. Prerequisite: Wildl. 801.

## **WOMEN'S STUDIES**

811. **AERIAL PHOTO INTERPRETATION (4:2:6)** Techniques of photo interpretation; type mapping of wildlife environments; photo censusing of wild animals.

813. **WETLANDS AND FISHERIES MANAGEMENT (3:3:3)** Introduction to basic limnology. Ecology and management of swamp, marsh, pond, and stream habitats and their animal populations. Prerequisites: Wildl. 801, 802, 803, 804.

## **WOMEN'S STUDIES (WMNST)**

200. **WOMEN'S STUDIES (3:3:0)** Interdisciplinary study of woman; analyses of relationships between definitions of woman provided by various disciplines and contemporary issues concerning women.



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The Pennsylvania State University

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# Bulletin

1984-1986

The Pennsylvania State University

## Associate Degree Programs

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## STATEMENT OF NONDISCRIMINATION

The Pennsylvania State University, in compliance with applicable federal and state equal opportunity laws and regulations governing affirmative action and nondiscrimination, does not discriminate in the recruitment, admission, and employment of students, faculty, and staff in the operation of any of its educational programs and activities as defined by law. Accordingly, nothing in this publication should be viewed as directly or indirectly expressing any limitation, specification, or discrimination as to race, religion, color, or national origin; or to handicap, age, sex, or status as a disabled or Vietnam-era veteran, except as provided by law. Any inquiries concerning this policy may be directed to the vice president for student affairs.

## REGULATIONS SUBJECT TO CHANGE

Each step of the educational process, from admission through graduation, requires continuing review and appropriate approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

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# UNIVERSITY CALENDAR\*

## SPRING SEMESTER 1984

### JANUARY

- 10 Tuesday – Arrival date
- 11-13 Wednesday to Friday – Orientation and registration
- 16 Monday – Classes begin 8:00 a.m.

### MARCH

- 5-9 Monday to Friday – Spring holiday, no classes

### MAY

- 4 Friday – Classes end 9:30 p.m.
- 5-6 Saturday, Sunday – Study days
- 7-12 Monday to Saturday – Final examinations
- 19 Saturday – Spring commencement

## SUMMER SESSION 1984

### JUNE

- 10 Sunday – Arrival date
- 11-12 Monday, Tuesday – Orientation and registration
- 13 Wednesday – Classes begin 8:00 a.m.

### JULY

- 4 Wednesday – Independence Day holiday, no classes

### AUGUST

- 8 Wednesday – Classes end
- 9-11 Thursday to Saturday – Final examinations
- 18 Saturday – Summer commencement

## FALL SEMESTER 1984

### AUGUST

- 19 Sunday – Arrival date
- 20-23 Monday to Thursday – Orientation and registration
- 24 Friday – Classes begin 8:00 a.m.

### SEPTEMBER

- 3 Monday – Labor Day holiday, no classes

### NOVEMBER

- 22-25 Thursday to Sunday – Thanksgiving holiday, no classes

### DECEMBER

- 11 Tuesday – Classes end
- 12-13 Wednesday, Thursday – Study days
- 14-15 Friday, Saturday – Final examinations
- 17-20 Monday to Thursday – Final examinations

## SPRING SEMESTER 1985

### JANUARY

- 8 Tuesday – Arrival date
- 9-11 Wednesday to Friday – Orientation and registration
- 14 Monday – Classes begin 8:00 a.m.

### MARCH

- 4-8 Monday to Friday – Spring holiday, no classes

### MAY

- 3 Friday – Classes end
- 4-5 Saturday, Sunday – Study days
- 6-11 Monday to Saturday – Final examinations
- 18 Saturday – Spring commencement

\*This calendar is subject to change without notice. Although the University makes every effort to avoid conflicts with religious holidays in preparing the calendar for an academic year, such conflicts are sometimes unavoidable. When they occur, efforts are made to make special arrangements for the students affected.

## SUMMER SESSION 1985

### JUNE

- 9 Sunday — Arrival date
- 10-11 Monday, Tuesday — Orientation and registration
- 12 Wednesday — Classes begin 8:00 a.m.

### JULY

- 4 Thursday — Independence Day holiday, no classes

### AUGUST

- 7 Wednesday — Classes end
- 8-10 Thursday to Saturday — Final examinations
- 17 Saturday — Summer commencement

## FALL SEMESTER 1985

### AUGUST

- 18 Sunday — Arrival date
- 19-22 Monday to Thursday — Orientation and registration
- 23 Friday — Classes begin 8:00 a.m.

### SEPTEMBER

- 2 Monday — Labor Day holiday, no classes

### NOVEMBER

- 28-30 Thursday to Saturday — Thanksgiving holiday, no classes

### DECEMBER

- 10 Tuesday — Classes end
- 11-12 Wednesday, Thursday — Study days
- 13-14 Friday, Saturday — Final examinations
- 16-19 Monday to Thursday — Final examinations

## SPRING SEMESTER 1986

### JANUARY

- 7 Tuesday — Arrival date
- 8-10 Wednesday to Friday — Orientation and registration
- 13 Monday — Classes begin 8:00 a.m.

### MARCH

- 3-7 Monday to Friday — Spring holiday, no classes

### MAY

- 2 Friday — Classes end
- 3-4 Saturday, Sunday — Study days
- 5-10 Monday to Saturday — Final examinations
- 17 Saturday — Spring commencement

# UNIVERSITY ADMINISTRATION

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DAVID R. STEWART, B.S., M.Ed., D.Ed. *Director of Student Programs and Services*  
TERRY K. ENGBAHL, B.A., M.S. *Director of University Relations*  
VONI B. GRIMES *Director of Business Services*

## PENN STATE CAMPUSES

### \*UNIVERSITY PARK CAMPUS

University Park, PA 16802  
Area Code 814 865-4700

### ALLENTOWN CAMPUS

Academic Building, Fogelsville, PA 18051  
Area Code 215 285-4811

### ALTOONA CAMPUS

Smith Building, Altoona, PA 16603  
Area Code 814 946-4321

### BEAVER CAMPUS

Brodhead Road, Monaca, PA 15061  
Area Code 412 775-8830

### \*BEHREND COLLEGE

Erie (Station Road, Harborcreek), PA 16563  
Area Code 814 898-1511

### BERKS CAMPUS

R.D. 5, Tulpehocken Road, P.O. Box 2150,  
Reading, PA 19608  
Area Code 215 375-4211

### \*CAPITOL CAMPUS

Middletown, PA 17057  
Area Code 717 948-6250

### DELAWARE COUNTY CAMPUS

25 Yearsley Mill Road, Media, PA 19063  
Area Code 215 565-3300

### DuBOIS CAMPUS

College Place, DuBois, PA 15801  
Area Code 814 371-2800

### FAYETTE CAMPUS

P.O. Box 519, Uniontown, PA 15401  
Area Code 412 437-2801

### HAZLETON CAMPUS

Highacres, Hazleton, PA 18201  
Area Code 717 454-8731

### MILTON S. HERSHEY MEDICAL CENTER

500 University Drive, Hershey, PA 17033  
Area Code 717 534-8521

### \*\*KING OF PRUSSIA CENTER

Graduate Studies and Continuing Education  
650 South Henderson Road  
King of Prussia, PA 19406  
Area Code 215 265-7640  
Graduate Studies  
Area Code 215 265-8622  
Continuing Education

### McKEESPORT CAMPUS

University Drive, McKeesport, PA 15132  
Area Code 412 678-9501  
Area Code 412 463-6401 (Pgh.)

### MONT ALTO CAMPUS

Mont Alto, PA 17237  
Area Code 717 749-3111

### NEW KENSINGTON CAMPUS

3550 7th Street Road, New Kensington, PA 15068  
Area Code 412 339-7561

### OGONTZ CAMPUS

1600 Woodland Road, Abington, PA 19001  
Area Code 215 886-9400

### SCHUYLKILL CAMPUS

State Highway, Schuylkill Haven, PA 17972  
Area Code 717 385-4500

### SHENANGO VALLEY CAMPUS

147 Shenango Avenue, Sharon, PA 16146  
Area Code 412 981-1640

### WILKES-BARRE CAMPUS

Lehman, PA 18627  
Area Code 717 675-2171

### WORTHINGTON SCRANTON CAMPUS

120 Ridge View Drive, Dunmore, PA 18512  
Area Code 717 961-4757

### YORK CAMPUS

1031 Edgecomb Avenue, York, PA 17403  
Area Code 717 771-4586

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\*Upper-division and graduate courses

\*\*Graduate courses



LOCATIONS																ASSOCIATE DEGREE MAJORS
	ALTOONA	BEAVER	BEHREND COLLEGE	BERKS	DELAWARE COUNTY	DuBOIS	FAYETTE	HAZLETON	HERSHEY MEDICAL CENTER	McKEESPORT	MONT ALTO	NEW KENSINGTON	OGONTZ	SCHUYLKILL	SHENANGO VALLEY	
	•	•	•	•	•	•	•	•		•	•	•	•	•	•	• Agricultural Business (1)
	•	•	•	•	•	•	•	•		•		•	•	•	•	• Air Pollution Control Engr. Technology (2)
							•								•	• Architectural Engineering Technology
	•	•	•	•	•	•	•	•		•		•	•	•	•	• Biomedical Equipment Technology (3)
	•	•	•	•	•	•	•	•		•	•	•	•	•	•	• Business Administration*
	•	•	•	•	•	•	•	•		•	•	•	•	•	•	• Chemical Engineering Technology (2)
									•							• Clinical Health Services+
					•		•									• Community Services*
	•	•			•					•		•		•		• Computer Science
																• Dietetic Food Systems Management#
	•	•	•	•	•	•	•	•		•		•	•	•	•	• Electrical Engineering Technology
											•					• Forest Technology
															•	• Highway Engineering Technology
				•												• Hotel and Food Service
				•	•											• Labor Studies*
	•	•	•	•	•	•	•	•		•	•	•		•	•	• Letters, Arts, and Sciences*
	•	•	•	•		•	•	•		•		•	•		•	• Mechanical Engineering Technology
								•				•				• Medical Laboratory Technology (5)
															•	• Metallurgical Engineering Technology
	•					•	•	•				•		•		• Mining Technology (6)
	•	•	•	•	•	•	•	•		•		•	•	•	•	• Nuclear Engineering Technology (7)
								•								• Physical Therapist Assistance (9)
											•				•	• Railway Engineering Technology (4)
	•	•				•				•		•			•	• Science
												•				• Science — Radiologic Technologist Radiographer Option
						•		•							•	• Sociology*
							•								•	• Solar Heating and Cooling Technology (8)
											•				•	• Surveying Technology
	•	•	•	•	•	•	•	•		•		•	•	•	•	• Telecommunications Technology (4)
						•										• Wildlife Technology

(1) Second year offered only at University Park

(2) Second year offered only at Berks

(3) Second year offered only at New Kensington and Wilkes-Barre

(4) Second year offered only at Wilkes-Barre

(5) Begins summer session at Hazleton and New Kensington

(6) Second year offered only at Altoona, Fayette, and New Kensington

(7) Second year offered only at Beaver and Hazleton

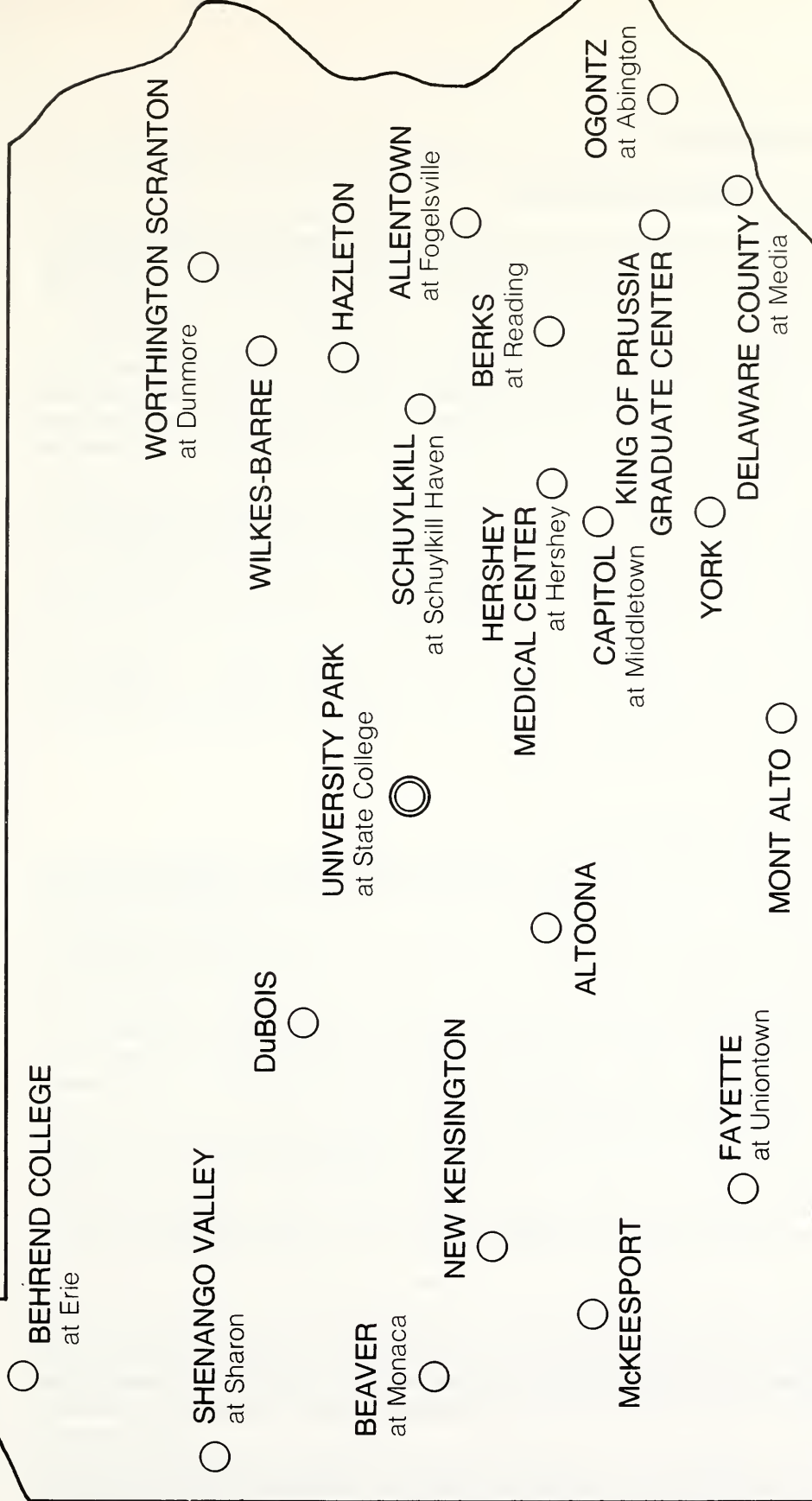
(8) Second year offered only at Fayette

(9) Begins summer session at Hazleton

\*Community Services, Labor Studies, and Sociology are offered as *extended degree* programs for students wishing to pursue part-time (day or evening) study. Letters, Arts, and Sciences also may be taken as an extended degree program at all University locations. Interested students should write to the Admissions Office or the nearest two-year campus to request a special application form for extended degree programs. Business Administration is offered at Ogontz primarily for evening students.

+ This program has special admission requirements including 60 undergraduate credits from a regionally approved college or university or equivalent. Therefore, this program is not open to freshman applicants.

#This program is available primarily through the Department of Independent Learning. For further information, write to the Department of Independent Learning, 128 Mitchell Building, University Park, PA 16802.



# THE UNIVERSITY

## MISSION OF THE UNIVERSITY

Penn State's fundamental responsibility is to provide programs of instruction, research, and public service, and thus act as an instrument of self-renewal and development for the Commonwealth. As Pennsylvania's land-grant university, Penn State must preserve and enhance its distinctive qualities.

While the modern university maintains links to the past and serves to maintain cultural values, its most extensive task at present is to help people to understand the great changes taking place in our society. People must have the skills and the learning habits that will make it possible for them to educate themselves over a lifetime. The rapid rate of change in contemporary society dictates that the University's programs adjust without undue delay to meet the needs of students and society.

University programs of research and other creative and scholarly activities are essential if the University is to contribute to the solution of the social, scientific, and technical problems of society and discharge effectively its upper-division and graduate teaching responsibilities. The University must also serve the Commonwealth directly through its programs of extension, continuing education, and other public service programs designed to meet the needs of citizens throughout the state.

By encouraging the enrollment of students from all segments of society and from other states and nations, the University provides the intellectual arena in which the search for rational solutions to societal problems can be nurtured, and in which teaching and learning can be the pivotal function. In performing this function, it is essential that the University foster independent thought and open discussion of alternatives.

## RESIDENT INSTRUCTION

The undergraduate degree programs of the University provide students with opportunities to increase their knowledge and understanding of the world, and to grow in their individual skills and capabilities for learning, analyzing, judging, creating, and communicating. All undergraduate degree programs and courses offered by the colleges of the University are under the academic sponsorship of a faculty committed to scholarship and are implemented under the academic policies and student rules established by the University Faculty Senate. They are intended to be flexible in accommodating students interested in learning, whether through traditional or non-traditional offerings, while enrolled on either a part-time or a full-time basis. The degree programs and courses of the colleges are offered through University administrative arrangements identified as Resident Instruction and Continuing Education.

The primary mission of Resident Instruction is to provide credit courses to degree candidates on University campuses as well as to administer certain off-campus credit-granting activities such as internships, practicums, field trips, and foreign studies. Students not formally admitted to degree candidacy (including provisional and nondegree students) may participate in Resident Instruction offerings as time and space permit.

## HISTORY

THE PENNSYLVANIA STATE UNIVERSITY, chartered by the Pennsylvania legislature as the Farmers' High School in 1855, was founded by professional men, educated farmers, and state and county agricultural leaders. A faculty of 4 met the incoming class of 69 students in February 1859.

In May 1862, the institution was renamed the Agriculture College of Pennsylvania, a name which recognized that its work was of collegiate level. Two months later, on July 2, President Abraham Lincoln signed the Morrill Land Grant Act offering each state free public land which it could sell to endow institutions of higher learning where "the leading object shall be, . . . to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."



On April 1, 1863, the state legislature declared that the Morrill Act "is hereby accepted by the State of Pennsylvania with all its provisions and conditions and the faith of the State is hereby pledged to carry the same into effect." The legislature then designated Penn State as the land-grant college of the Commonwealth.

The College broadened the scope of its instruction, began to admit women students, increase its enrollment, and enlarge its physical plant. Graduate work was offered as early as 1862. In 1874 the College was renamed the Pennsylvania State College.

In 1953 the name was changed again—to The Pennsylvania State University—in formal recognition of what Penn State had long since become, one of the country's leading universities. Its ten undergraduate colleges now offer 129 baccalaureate and 29 associate degree majors. The Behrend College, in Erie, offers 19 complete baccalaureate programs. The Capitol Campus, near Harrisburg, offers 19 baccalaureate degree majors. Graduate students may choose from 124 approved fields of study. The College of Medicine, at The Milton S. Hershey Medical Center in Hershey, offers the M.D. degree, the M.S. and Ph.D. in anatomy, biological chemistry, genetics, microbiology, pharmacology, and physiology, the M.S. degree in laboratory animal medicine, and the associate degree in Clinical Health Services.

The original student body of 69 has grown to 63,989, the faculty of 4 to 3,755. Beginning with an educational program which offered 40 courses, Penn State today offers 5,115 undergraduate and 2,929 graduate courses and 166 medical courses. The University, whose prime purpose has always been to serve the people and the interests of the Commonwealth and the nation, is accredited by the Middle States Association and is a member of the Association of American Universities.

## **ACADEMIC ORGANIZATION OF THE UNIVERSITY**

### **THE COLLEGES**

The University has ten colleges that offer undergraduate majors leading to baccalaureate and associate degrees: College of Agriculture, College of Arts and Architecture, College of Business Administration, College of Earth and Mineral Sciences, College of Education, College of Engineering, College of Health, Physical Education, and Recreation, College of Human Development, College of the Liberal Arts, and College of Science. In addition, the Capitol Campus at Middletown and the Behrend College at Erie provide an alternative educational setting in which students may enroll in selected degree programs.

### **THE COMMONWEALTH EDUCATIONAL SYSTEM**

The Commonwealth Educational System is the administrative organization for the University's system of Commonwealth Campuses and for the delivery of continuing education programs throughout the Commonwealth. Through the seventeen Commonwealth Campuses and the Continuing Education offices at University Park, the Behrend College, the Capitol Campus, Hershey, King of Prussia, and Williamsport, the Commonwealth Educational System offers a wide array of University courses and programs at locations convenient to virtually all of the population of the Commonwealth.

**COMMONWEALTH CAMPUSES**—In addition to the University Park Campus in the municipality of State College, the Behrend College in Erie, and the Capitol Campus in Middletown, full-time instruction is available at seventeen Commonwealth Campuses: Allentown, Altoona, Beaver (Monaca), Berks (Reading), Delaware County (Media), DuBois, Fayette (Uniontown), Hazleton, McKeesport, Mont Alto, New Kensington, Ogontz (Abington), Schuylkill (Schuylkill Haven), Worthington Scranton (Dunmore), Shenango Valley (Sharon), Wilkes-Barre, and York.



## TWO-YEAR ASSOCIATE DEGREE MAJORS

Majors which lead to two-year associate degrees are available at the Behrend College and all seventeen of the University's Commonwealth Campuses except Allentown as listed on page 10 of this bulletin. These majors provide concentrated instruction to prepare graduates for specialized occupational assignments, except for the Letters, Arts, and Sciences program, which provides graduates with a general education and some specialization in their fields of interest. In addition, a program in Clinical Health Services is available at the Hershey Medical Center, and a program in Dietetic Food Systems Management is available primarily through the Department of Independent Learning.

Twenty-nine associate degree programs lead to either the Associate in Arts degree, the Associate in Engineering degree, or the Associate in Science degree. The majors leading to these degrees are listed below.

### *Associate in Arts Degree*

Labor Studies  
Letters, Arts, and Sciences  
Sociology

### *Associate in Engineering Degree*

Air Pollution Control Engineering Technology  
Architectural Engineering Technology  
Biomedical Equipment Technology  
Chemical Engineering Technology  
Electrical Engineering Technology  
Highway Engineering Technology  
Mechanical Engineering Technology  
Metallurgical Engineering Technology  
Mining Technology  
Nuclear Engineering Technology  
Railway Engineering Technology  
Solar Heating and Cooling Technology  
Surveying Technology  
Telecommunications Technology

### *Associate in Science Degree*

Agricultural Business  
Business Administration  
Clinical Health Services  
Community Services  
Computer Science  
Dietetic Food Systems  
Management  
Forest Technology  
Hotel and Food Service  
Medical Laboratory Technology  
Physical Therapist Assistance  
Science  
Wildlife Technology

A description of the purposes, objectives, and content of each of the two-year majors is given on succeeding pages.

Most of Penn State's associate degree enrollment at present is concentrated in its engineering technology majors. The engineering technology graduate, a specialist in applied rather than theoretical engineering, is equipped to translate creative ideas into new machines, products, structures, and processes. He or she understands the basic scientific principles which are the tools of the graduate engineer and is acquainted with the production tools and materials of the skilled worker.

The Commonwealth Campuses and the Behrend College also offer up to two years of work in most of the four-year baccalaureate degree majors offered by the University.

**STATEMENT OF BASIC ACADEMIC ADMISSIONS POLICIES** – Admission to the University credit courses or degree candidacy at The Pennsylvania State University is governed by policies established by the University Faculty Senate. Although specific applications of these policies may vary from year to year, from location to location, and from program to program, all University admissions are governed by the following general policies:

1. As an institution of higher education, The Pennsylvania State University is committed to making post-high school education available to all who possess a high school diploma or its equivalent without restriction as to race, sex, religion, color, ancestry, national origin, ethnic origin, or handicap or age as provided by law.
2. The primary responsibility of the University is to residents of the Commonwealth of Pennsylvania. Consequently, within limits expressed from time to time by the Board of Trustees of the University, preference shall be given to Pennsylvania residents in the various admission processes.

3. In order to meet the variety of goals and objectives of the population, the spectrum of offerings is designed to enable persons with a variety of objectives — both degree and nondegree — to receive higher education. Although access to educational opportunities of the University is open to all, courses offered for credit are available to those holding a high school diploma or its equivalent. Policies governing admission to degree candidacy are established by the University Faculty Senate (with delegation of policies governing admissions to graduate programs to the Graduate Faculty of the University) under a general policy of offering admissions to those whose past academic performance indicates a reasonable probability of success.
4. Undergraduate students are admitted to either baccalaureate degree candidacy or associate degree candidacy. To be admitted to degree candidacy, the individual must present an academic performance record which indicates a reasonable probability of his or her success in his or her chosen program. In the case of freshman admission to undergraduate degree candidacy, performance is measured through the high school record and standardized test results. In the case of advanced standing admission, performance is measured either through success in nondegree programs and courses of the University or by success at some other institution of higher education.
5. Within the space available in particular programs and at particular locations, admissions shall be offered preferentially to those whose performance record indicates the highest probability of success in the chosen program—with this process continuing until all available spaces are filled. Although exceptions to this policy may be made from time to time (for example, recipients of scholarships with restricting qualifications), these exceptions may be made only for students who meet at least the minimum admission and entrance requirements.
6. If a college requires restrictions on its baccalaureate admissions, the priorities or quotas established must include provisions to consider qualified students in each of these groups:
 

Admissions Group I—Freshman Admissions: Students who hold a high school diploma or equivalent, who present fewer than 18 credits of baccalaureate work (from The Pennsylvania State University or another accredited institution), who meet minimum college entrance requirements, and who meet minimum college admission standards are considered in this group.

Admissions Group II—Penn State Advanced Standing Admissions: Students who (1) request baccalaureate degree readmission, presenting 18 or more credits; (2) request a change from The Pennsylvania State University associate degree to baccalaureate degree status, presenting 18 or more applicable credits (including Type II, The Pennsylvania State University associate degree graduates); or (3) request a change from The Pennsylvania State University provisional degree to baccalaureate degree status, presenting 18 or more applicable credits, are considered in this group. In all Penn State advanced standing admissions, it is understood that the student must have a G.P.A. of at least 2.00 as computed at Penn State and meet the minimum entrance and advanced standing requirements of the college.

Admissions Group III—Other Advanced Standing Admissions: Students who (1) request changes from The Pennsylvania State University nondegree to baccalaureate degree status, presenting 18 or more applicable credits; or (2) have not been students at Penn State and request baccalaureate degree status at Penn State, presenting 18 or more applicable credits. In all advanced standing admissions it is understood that the student must have a G.P.A. of 2.00 as computed at Penn State and meet the minimum entrance and advanced standing requirements of the college.

Within these three groups, no special consideration will be given to any group; students will be admitted to the college on the basis of academic competition (e.g., SAT scores, grade-point averages, grades in required courses in the college, and other evidence predictive of baccalaureate degree performance where available, valid, and reliable).
7. To assure a proper educational mix of students and to further broaden the educational opportunities offered by the University, the University Faculty Senate and the University administration may from time to time authorize various specialized programs. These programs may permit students who do not meet the basic qualifications for admission to degree candidacy to be admitted to such candidacy. These programs may also permit, in selected situa-



tions, exceptional students who have not earned a high school diploma or its equivalent to enroll in University credit courses. Such specialized programs may include up to 10 percent of the total admission group for the University in any one year and up to a maximum of 15 percent of the admission to any geographic location of the University.

8. Within this general policy, colleges of the University, with the concurrence of the University Faculty Senate, may impose certain educational background requirements (Carnegie Units) which must be completed by an individual before being admitted to degree candidacy.

**ADMISSION REQUIREMENTS—*Freshman Admission***—A person who holds a high school diploma or its equivalent, and who has not taken credit courses at an institution of higher learning, or a person who holds a high school diploma or its equivalent and who has taken less than 18 semester credits at an accredited college or university may be considered for admission as a freshman.

Applicants for admission to all associate degree programs must submit scores of the Scholastic Aptitude Test of the College Entrance Examination Board.

All applications should be addressed to the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802. Telephone: (814) 865-5471.

The University reserves the right to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

An applicant must state in writing whether he or she has attended any other institution of higher learning, even though advanced standing is not desired. Failure to indicate, at the time of registration, previous registration in another institution invalidates the admission.

To be admitted to degree candidacy, the applicant must have completed certain educational background requirements, called Carnegie Units or secondary school units. To determine whether you have the appropriate secondary school units required for your choice of a program of study, refer to page 20 to the program of your choice. Then read across to determine the necessary units.

***Admission with Advanced Standing***—An applicant who has attempted at least 18 semester credits at an accredited college or university and has a minimum cumulative grade-point average of at least 2.00 (on a 4.00 scale as computed at Penn State) for all graded courses at all colleges and universities previously attended may be considered for admission with advanced standing.

In all cases where work has been taken at other institutions, an official transcript from each place of attendance must be submitted directly to the Undergraduate Admissions Office by the institutions attended. The latter must include evidence that the student was honorably dismissed and was in good academic standing at the time of leaving.

Advanced standing credits may be awarded for work taken at fully accredited institutions provided the grade earned is equivalent to a grade of A, B, or C at this University, and the credits are useful to the student's program of study. In certain circumstances, the University may need to restrict advanced standing admissions in particular programs because of space limitations.

Associate degree programs have a limit on the number of credits that may be accepted by transfer from accredited institutions. Information on credit limitations may be obtained from the academic official responsible for a particular program.

Credits are transferred, but grades and grade points are not. Advanced standing students enter the University without an average, and their average begins with the completion of their first semester of study at Penn State.

***Provisional Student (Degree-Seeking)***—An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admission as a degree candidate may enroll in credit courses at the University. A provisional student may enroll in credit courses if the following criteria are met:

1. The student is making satisfactory progress toward admission as a degree candidate. Progress is satisfactory if a student has earned 18 credits with a minimum grade-point average of 2.00 (on a 4.00 scale). If a student attempted 18 credits and earned less than 2.00, the student is given a warning. A student who has earned 27 credits with a grade-point average

of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent semester. No student, regardless of cumulative grade-point average, who has completed 36 credits will be permitted to enroll as a provisional student in any subsequent semester.

2. There is space available after degree candidates have been accommodated.
3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons may petition for an exception to the policy.

A provisional student may apply to become an associate degree candidate after completing 9 credits of Penn State course work with a minimum grade-point average of 2.00. All these credits must be earned at this university. The applicant must also satisfy the entrance requirements of either the major in which enrollment is desired or of the Division of Undergraduate Studies if the student wishes to enroll in that division. An applicant who has completed at least the equivalent to one year's associate degree work before applying for admission as an associate degree candidate must have the approval of either the dean of the college in which enrollment is desired or of the director of the Division of Undergraduate Studies if the student wishes to enroll in that division. After a student is admitted as a degree candidate, the dean of the college of enrollment decides which credits earned as a provisional student may be used to fulfill the degree requirements.

*Nondegree Student*—Any person having received a high school diploma or its equivalent may be permitted to enroll in credit courses (either for credit or audit) at the University. Some of these persons will be classified as nondegree students.

A nondegree student who has not been dropped from degree or provisional status by this University or any other college or university for unsatisfactory scholarship will be listed as a nondegree-regular student and may enroll in any number of credits not to exceed the typical credit load of a full-time student per semester if criteria 1, 2, and 3 are met.

A nondegree student who has been dropped from degree or provisional status by this University or any other college or university because of unsatisfactory scholarship will be listed as a nondegree-conditional student and may enroll in a maximum of 9 credits per semester if criteria 1, 2, 3, and 4 are met.

1. The student has completed the prerequisites for the courses to be scheduled or has obtained permission from the instructor to schedule the course.
2. There is space available after degree candidates and provisional students have been accommodated.
3. The student has not been dismissed or suspended for nonacademic reasons from any college or university.
4. The student has obtained academic advising/counseling from an adviser/counselor designated by the academic unit to which admission, or reinstatement and readmission, is desired.

Note: A student must be admitted, or reinstated and readmitted, as a degree candidate to apply the credits earned as a nondegree student toward fulfilling the requirements for a degree. The dean of the college of enrollment shall decide which credits may be used to fulfill the degree requirements.

An individual desiring to take associate degree courses as a provisional student (degree-seeking) or nondegree student should submit the appropriate application for admission. An application form may be obtained from the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802, or from the office of the director of any Commonwealth Campus of The Pennsylvania State University.



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**BASIC SKILLS** – All students entering the freshman class in an associate degree program are tested for basic skills in English composition, reading, and mathematics.

Students identified with major weaknesses in English composition are required to enroll in English 4 (3 credits) prior to scheduling English 15. Students with reading and/or mathematics weaknesses are encouraged to strengthen these skills through other available University resources.

Students are encouraged through the Basic Skills Program to overcome possible difficulties early in their college careers to ensure greater success with their academic studies.

**DIVISION OF UNDERGRADUATE STUDIES**—This division is an academic unit of the University which offers at the Commonwealth Campuses, the Behrend College, and the University Park Campus the following programs and services:

*Freshman Testing, Counseling, and Advising Program*—All new freshmen admitted to the University are provided comprehensive testing, counseling, and academic advising prior to attending first-semester classes. The purpose of the program is to provide all new students with assistance in evaluating their educational plans and objectives.

*Enrollment*—New freshmen who prefer to test their abilities and interests or who wish to explore several areas of study before identifying themselves with one of the University’s colleges can request to begin their studies in the Division of Undergraduate Studies. At any time in their academic careers, students whose interests or career objectives change can request that they be enrolled in 2-DUS (Division of Undergraduate Studies). Specialized academic advising in DUS accompanies students’ attendance in regular courses until students choose a new program and meet its academic standards for transfer.

*Advising and Counseling*—All students, whether or not they are enrolled in the Division of Undergraduate Studies, have available to them the professional advising, counseling, and referral services provided by the division. Such services are a supplement to and are coordinated with the advisory services of the colleges and faculty. Provisional students aspiring for degree programs are also served by this unit.

*Undergraduate Academic Information*—The Division of Undergraduate Studies provides a comprehensive academic information support system throughout the University to assist faculty in their student advisory responsibilities. DUS academic information centers are located at every Commonwealth Campus and in the colleges at University Park.

**GRADING SYSTEM**—The grades of A, B, C, D, and F indicate the following qualities of academic performance:

- A (EXCELLENT) Indicates exceptional achievement.
- B (GOOD) Indicates extensive achievement.
- C (SATISFACTORY) Indicates acceptable achievement.
- D (POOR) Indicates only minimal achievement. It indicates that the student may be seriously handicapped in carrying a more advanced course for which this course is a specific prerequisite.
- F (FAILURE) Indicates inadequate achievement necessitating a repetition of the course in order to secure credit.

The grades of A, B, C, D, and F are assigned the following grade-point equivalents:

Grade	Grade-Point Equivalent
A	4.00
B	3.00
C	2.00
D	1.00
F	0

Grade points are determined by multiplying the grade-point equivalent of the grade earned by the number of credits for the subject; e.g., ENGL 015, 3 credits, with a grade of A (grade-point equivalent 4.00) yields 12 grade points.

**GRADUATION REQUIREMENTS**—In order to graduate, a student must complete the course requirements of the major and earn at least a C average (a grade-point average of 2.00) for all courses.

**DEGREES**—The associate degree majors outlined in this bulletin lead to the following degrees: Associate in Arts, Associate in Engineering, and Associate in Science.

# SECONDARY SCHOOL UNITS REQUIRED FOR ADMISSION CONSIDERATION TO ASSOCIATE DEGREE PROGRAMS

	English	Math. (A)*	Math. (B) +	Math. (C)**	Science	Other Subjects	Total
Agricultural Business	3					12	15
Air Pollution Control Engineering Technology	3	2				10	15
Architectural Engineering Technology	3	2				10	15
Biomedical Equipment Technology	3	2				10	15
Business Administration (2-year)	3		2			10	15
Chemical Engineering Technology	3	2				10	15
Clinical Health Services	3			2	2 + +	8	15
Community Services	3					12	15
Computer Science	3	2				10	15
Dietetic Food Systems Management	3					12	15
Electrical Engineering Technology	3	2				10	15
Forest Technology	3		2			10	15
Highway Engineering Technology	3	2				10	15
Hotel and Food Service	3					12	15
Labor Studies	3					12	15
Letters, Arts, and Sciences	3					12	15
Mechanical Engineering Technology	3	2				10	15
Medical Laboratory Technology	3	2			2 + +	8	15
Metallurgical Engineering Technology	3	2				10	15
Mining Technology	3	2				10	15
Nuclear Engineering Technology	3	2				10	15
Physical Therapist Assistance	3		1‡		1#	10	15
Railway Engineering Technology	3	2				10	15
Science (2-year)	3	2				10	15
Radiologic Technologist Radiographer	3	2				10	15
Sociology (2-year)	3					12	15
Solar Heating and Cooling Technology	3	2				10	15
Surveying Technology	3	2				10	15
Telecommunications Technology	3	2				10	15
Wildlife Technology	3		2			10	15

\*Math. (A) requirements may be satisfied by at least 2 units of mathematics: 1 unit of algebra and 1 additional unit in any combination of advanced algebra, plane geometry, solid geometry, or trigonometry.

+Math. (B) requirements may be satisfied by any 2 units of mathematics, but it is strongly recommended that the 2 units be 1 of algebra and 1 of plane geometry.

\*\*Math. (C) requirements may be satisfied by 1 unit of algebra and 1 additional unit in mathematics.

+ +Biology and chemistry are recommended.

‡The one unit of mathematics should be in algebra. It is strongly recommended that one additional unit of mathematics be completed.

#The one unit of science should be in biology. It is strongly recommended that one additional unit of science be completed.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE UNIVERSITY PARK CAMPUS**—Credits received for 800-series courses may be applicable to a particular baccalaureate degree program listed in the current baccalaureate degree bulletin of The Pennsylvania State University at the discretion of the appropriate college and major department.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE CAPITOL CAMPUS**—In addition to receiving an education to prepare for employment, the graduate of an associate degree program may also qualify for admission to various programs leading to a baccalaureate degree from Penn State's Capitol Campus. Those anticipating admission to the Capitol Campus should inquire at the Capitol Campus Admissions Office late in their freshman year or early in their sophomore year concerning baccalaureate program course requirements.

Graduates from associate degree programs in Business Administration or Computer Science may wish to consider further study at the Capitol Campus in a Business Administration baccalaureate degree program.

Graduates of the associate programs of Air Pollution Control Engineering Technology, Architectural Engineering Technology, Biomedical Equipment Technology, Electrical Engineering Technology, Mechanical Engineering Technology, Nuclear Engineering Technology, Solar Heating and Cooling Technology, Surveying Technology, and Telecommunications Technology may wish to consider continuing at the Capitol Campus in a program of study in engineering technology leading to a Bachelor of Technology degree in Building Construction Technology, Electrical Design Engineering Technology, Energy Technology, Mechanical Design Engineering Technology, or Water Resources Engineering Technology.

The following associate degrees are also acceptable toward admission to programs leading to a baccalaureate degree at the Capitol Campus: Letters, Arts, and Sciences; and Sociology.

## STUDENT WELFARE

**ORIENTATION PROGRAM**—At the opening of the fall semester all new students participate in an orientation program. In addition to becoming acquainted with the new environment in which they will live and study, students receive instruction and counseling concerning their courses of study, participate in extracurricular activities, and in the cultural opportunities open to them. Registration is also held during this period.

**STUDENT GOVERNMENT**—Representative student leadership is provided on each campus of the University by a student government association which functions through officers and representatives elected from and by the student body. In addition to their involvement in student programs at their local campuses, student officers and delegates from University campuses convene several times annually. These meetings provide for an exchange of information among the various student government associations and for system-wide coordination in student government and student activities.

**STUDENT CONDUCT**—The University regards as serious offenses all acts of unethical, immoral, dishonest, or destructive behavior, as well as violations of University regulations as set forth in each campus's student handbook and in the *Policies and Rules for Students*, a copy of which is available to each student upon registration.

**INSURANCE PROTECTION WHILE ATTENDING THE UNIVERSITY**—Any student who desires insurance protection while in attendance at the University (1) for accident and health and/



## GENERAL INFORMATION

or (2) for loss of property by fire or theft should arrange personally for whatever insurance seems desirable through an agency of his or her choice. Accident and health programs are available under the sponsorship of the Undergraduate or Graduate Student Government Organization.

**HEALTH SERVICES**—The University Health Service assists in promoting and maintaining the health of students.

Every new full-time student must successfully complete a physical examination before being permitted to register for classes at the University.

The health services of the University are made available to students in accordance with a statement provided by each campus, pertinent to that campus, and published in its student handbook.

The University does not obligate itself for payment of medical services other than those provided by personnel employed or retained by the University and in facilities owned or contracted for by the University. Treatment provided in contract facilities must be authorized by the campus executive officer, the director of student programs and services, or the nurse.

Students are urged to protect themselves against medical expenses that may result from injury or illness by arranging for personal insurance coverage.

**CAREER DEVELOPMENT AND PLACEMENT**—The Career Development and Placement Center assists students in continual evaluation of their educational and career plans as they progress through college and helps them identify sources of personal or academic difficulty which may interfere with their progress. Individual as well as group educational and career counseling programs are available to students.

A student programs and services staff member at each campus has responsibility for providing placement assistance for associate degree graduates. Services include inviting employers to the campus to interview graduates for permanent employment, providing job information, and assisting students in preparing for job interviewing. The Career Development and Placement Center at the University Park Campus supplies prospective employers (national, state, and local) with information concerning the associate degree programs and works cooperatively with the Commonwealth Campuses in assisting graduates to locate suitable employment.

# STUDENT AID

In addition to the student aid information provided below, students may wish to consult the admissions booklet “It Takes Two” sent to all applicants and the “Penn State Student Financial Aid” brochure available upon request. Additional questions should be directed to the Office of Student Aid, 335 Boucke Building, on the University Park Campus, or to the Office of Student Programs and Services at a Commonwealth Campus.

## AID PROGRAMS AVAILABLE TO ASSOCIATE DEGREE CANDIDATES

### GRANTS (aid sources not requiring repayment)

*Pell Grant* (formerly Basic Educational Opportunity Grant) – The Pell Grant is the major federal grant program available to undergraduates. This award is available to undergraduates pursuing their first baccalaureate or associate degree on at least a half-time basis (6 credits per semester).

*Pennsylvania Higher Education Assistance Agency Grant (PHEAA)* – This is a grant established by the Commonwealth to assist undergraduates who have a financial need as defined by PHEAA guidelines. Applicants must be residents of Pennsylvania and enrolled full time.

**Note:** Non-Pennsylvania students should contact their state higher education assistance agencies for information on state grants available for attending Penn State. Names and addresses of higher education assistance agencies are available from the Office of Student Aid, 335 Boucke Building, or the Office of Student Programs and Services at Commonwealth Campuses.

*Supplemental Educational Opportunity Grant (SEOG)* – This grant is available to undergraduates with high documented financial need. It is normally awarded in combination with the College Work Study Program or the National Direct Student Loan.

*Penn State Academic Grant* – This grant is awarded to students demonstrating academic excellence and high financial need. Students completing the application process for campus-based aid (NDSL, SEOG, CWSP) will be automatically considered for this grant.

### LOANS

*Guaranteed Student Loan Program (GSL)* – The GSL is a federally subsidized loan program, available through banks, savings and loan associations, and other private lenders, which offers students attending on at least a half-time basis the opportunity to borrow money for their education. An undergraduate may borrow up to \$2,500 per year with a maximum of \$12,500 for undergraduate studies. All students must file a needs test form with the GSL application to determine loan eligibility. Needs test forms are available from lending institutions with loan applications or from the Office of Student Aid at University Park or the Office of Student Programs and Services at Commonwealth Campuses. Students from families with an adjusted gross income greater than \$30,000 are eligible for GSL assistance based on documented financial need. Repayment begins six months after the termination of the student’s education at an interest rate of 9 percent per year simple interest (anticipated to drop to 8 percent for spring semester 1984).

*PLUS Loan* – This is an educational loan available to parents of dependent undergraduate students. It is also available to independent undergraduates and to graduate students. Similar to the GSL program, funds are provided by private lenders such as hometown banks, etc. The interest rate is 12 percent. Repayment of the loan begins within sixty days. Student borrowers may defer repayment of principal until six months after termination of studies.

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*National Direct Student Loan (NDSL)*—This program provides loans of up to \$1,500 per year with an overall maximum of \$6,000 for undergraduate students with documented financial need. Repayment starts six months after termination of the student's education at an interest rate of 5 percent per year simple interest. Postponement of repayment and loan cancellation may be arranged for certain types of employment following graduation.

*University Loans*—University loans are funds established by donors to help students who have a documented financial need. These loans help needy students meet the educational and living expenses required to attain a college degree. Repayment starts immediately after the student completes his or her studies at a simple interest rate of 6 percent per year. Simple interest accrues at 6 percent during the in-school period and any subsequent deferment period.

## EMPLOYMENT

*College Work Study Program (CWSP)*—The CWSP is a form of federal aid which allows a student to earn a portion of the documented financial need through approved CWSP jobs. This is a nonrepayable source of aid since the student is paid an hourly wage for his or her employment.

*Student Employment*—Students who are interested in part-time employment on campus or in the State College area should contact the Student Employment Office, 301A Boucke Building, University Park, PA 16802, or contact the director of student programs and services at Commonwealth Campuses. Earnings from University employment must, according to federal regulations, be considered an aid resource which will be counted toward meeting a student's financial need.

## SCHOLARSHIPS

*University Scholarships*—University scholarships are awarded on the basis of superior high school or college academic performance and, in most cases, documented financial need. They are awarded either by the scholarship committees in the various academic colleges of Penn State, by the Freshman or Faculty Senate Scholarship Committee, or by the Commonwealth Campus Scholarship Committees.

## HOW TO APPLY

After completing the application for admission to the University, each student seeking aid consideration should complete the forms necessary for each aid program being sought.

### I. Aid Awarded by the Federal Government

#### Pell Grant

(All undergraduate students)

Students who have completed the application for Pennsylvania State Grant and Federal Student Aid or the Financial Aid Form (FAF) are considered for the Pell Grant program. After receiving the Student Aid Report (SAR), which designates eligibility for a Pell Grant, follow the instructions contained on the SAR to finalize the award. Applications are available from high school guidance counselors, the Office of Student Aid, or the director of student programs and services at Commonwealth Campuses. They should be completed as soon after January 1 as possible. Transfer students must request a Financial Aid Transcript to be sent to the Office of Student Aid, 335 Boucke Building, University Park, PA 16802, from each institution previously attended whether or not aid was received.

### II. Aid Awarded/Coordinated by the States

PHEAA Grant (Pennsylvania residents only)

Other state grant/scholarship programs

Guaranteed Student Loan

PLUS Loan



**(Undergraduates)**

Pennsylvania residents should complete the application for Pennsylvania State Grant and Federal Student Aid. Students currently receiving PHEAA grants will receive renewal applications by mail from the PHEAA agency. Regular applications are available from high school guidance counselors, the Office of Student Aid, and the director of student programs and services at Commonwealth Campuses in addition to the Pennsylvania Higher Education Assistance Agency. Applications should be completed as soon after January 1 as possible. Non-Pennsylvania students should contact their state's Higher Education Agency for information on aid programs available to them as Penn State students.

**(PA and non-PA residents)**

Contact a local bank or lending institution for application forms for the Guaranteed Student Loan Program and the PLUS Loan. After completing the forms, submit them to the Office of Student Aid, 335 Boucke Building, University Park, PA 16802, along with a stamped envelope addressed to the lender. Students should allow six to eight weeks for the processing of their loan application.

**III. Aid Awarded by The Pennsylvania State University**

Supplemental Educational Opportunity Grant (SEOG)

National Direct Student Loan (NDSL)

College Work Study Program (CWSP)

University loans and scholarships

**(All students)**

Complete the application for Pennsylvania State Grant and Federal Aid or the Financial Aid Form (FAF).

Note: Freshman students need only to complete one of the above forms to be considered for aid awarded by Penn State. Both forms are available from high school guidance counselors, the Office of Student Aid, or the director of student programs and services at Commonwealth Campuses. The recommended filing date for consideration is February 15; however, students are encouraged to submit applications as soon after January 1 as possible.

**(All students except entering freshmen)**

Complete the Office of Student Aid's Financial Aid Application. Students may indicate on this application the type of aid they are seeking, with the exception of University scholarships. File by April 1. The application is available from the Office of Student Aid or the director of student programs and services at Commonwealth Campuses.

**(All students except entering freshmen)**

Complete the University Scholarship Application. Since funds are limited, applications are only encouraged from those students with a cumulative grade-point average of 3.00 or higher. File by April 1. This application is available from the Office of Student Aid or the director of student programs and services at Commonwealth Campuses.

**(Transfer students only)**

Complete a Financial Aid Transcript. It is necessary for the University to know if you received aid at any other institution prior to enrolling at Penn State. Request this form from the Office of Student Aid. A Financial Aid Transcript must be submitted from all schools previously attended whether or not aid was received.

**IV. Private Aid Sources**

All students are urged to explore local scholarship/grant opportunities as well as any private low-interest loan funds offered by local employers and civic organizations.



GENERAL INFORMATION

HOW MUCH DOES IT COST TO ATTEND PENN STATE?

One of the major concerns of students and their parents is knowing how much it will cost to attend Penn State for an academic year. The following itemized listing of expenses, although prepared for the 1983-84 academic year, may be used as a basic guide for your planning. Students may find that some of the costs vary according to individual needs and circumstances.

STUDENT BUDGET – 1983-84

	<i>Residence Halls or Off-Campus Housing (All Campuses)</i>	<i>Living at Home</i>
Commonwealth Campus Tuition	\$1,996.00*	\$1,996.00*
Room & Board	2,464.00	1,100.00
Books & Supplies	350.00	350.00
Clothing & Laundry, Transportation, Personal Maintenance, Medical, & Recreation	1,850.00	2,350.00
Total*	\$6,660.00	\$5,796.00

\*For non-Pennsylvania residents the nonresident undergraduate tuition figure of \$4,644.00 should be substituted. The total estimated budget for an out-of-state undergraduate student at University Park Campus or a Commonwealth Campus is \$9,308.00.

The 1983-84 tuition at the University Park Campus, the Capitol Campus, and the Behrend College is \$2,312.00.

STUDENT AID POLICIES

The Office of Student Aid at Penn State administers and coordinates the aid programs according to applicable federal and state regulations and University policies which guarantee each student equal access to financial assistance. The Office of Student Aid employs the standard need analysis services of the College Scholarship Service and the Pennsylvania Higher Education Assistance Agency to assess the aid eligibility of student applicants, ensuring equity of treatment among all applicants. The University does not discriminate on the basis of race, creed, color, national origin, handicap, age, or sex in any of its policies, practices, or procedures.

Eligibility for aid is contingent upon the student's financial need for assistance to meet educational costs. Each program has specific eligibility requirements which must be met before funds are awarded. In addition to financial need as a criterion for receiving aid, a student must be enrolling as a degree or provisional student. Nondegree students are not eligible to receive aid at Penn State. The University may require an official copy of the Federal Income Tax Form 1040 to verify eligibility for aid.

The Office of Student Aid assumes that all aid applicants will keep apprised of all application deadlines pertaining to the aid sources they are seeking. Because limited funds are available, applications filed after the applicable deadline dates are considered only as funds permit. On-time applicants receive first consideration. Some aid programs have flexible application deadlines which permit students to receive consideration at most times during the year (for example, the GSL and Pell Grant programs). Current and prospective aid recipients are strongly encouraged to keep well informed of aid application procedures through aid publications, news media, and agencies providing aid information such as the Office of Student Aid at University Park and the Office of Student Programs and Services at Commonwealth Campuses.

Aid is never automatically awarded for subsequent years. Students must reapply each year for funds. Students who plan to attend the summer session must file separate applications to be considered for almost all aid programs. The major exceptions to this requirement are as follows:

1. Entering freshmen seeking aid awarded by the University (see “How to Apply” above) must file only the application for Pennsylvania State Grant and Federal Student Aid or the FAF to receive consideration for the summer session if they have been admitted to the University specifically to begin during the summer session; and
2. The Pell Grant program has no separate summer application and is generally awarded to students during the fall-spring academic year. (Pell Grant recipients not attending the entire fall-spring year should contact the Office of Student Aid to determine if a summer payment is possible.)

One of the goals of the Office of Student Aid is to help financial aid recipients receive a financial aid package which will attempt to meet the student's documented financial need. The financial aid package can be composed of federal aid, state grant monies, private award sources, or any other source of funds available to the student, including earnings from University employment.

It is the responsibility of the Office of Student Aid, however, to assure the federal government that federal aid recipients will not be permitted to retain financial aid *exceeding* the students' need. Students should be aware that if the aid received is in excess of need, they will be notified of their responsibility to return the excess amount to the University.

#### FEDERAL STUDENT ASSISTANCE SATISFACTORY ACADEMIC PROGRESS STANDARD

Satisfactory academic progress must be maintained for continued consideration for federal financial assistance at Penn State. Students must comply with the following to insure continued consideration:

1. Minimum standards for satisfactory scholarship established by Senate Policy Section 54-54 of the *Academic Policies and Procedures for Undergraduate Students* published in the *Penn State Student Handbook*.
2. Associate degree candidates must complete a minimum of 26 credits per academic level.
3. Students falling below this minimum by no more than 10 credits will be granted a probationary period to attain the minimum earned credit requirement while retaining aid eligibility.
4. When a student falls below this probationary level, the student becomes ineligible for aid.
5. While ineligible, federal aid is denied until the appropriate credit expectation has been reached for the next academic year.
6. Complete the requirements for the associate degree within six semesters.

Exceptions to the above and information concerning reinstatement of aid, course audits, deferred grades, and course repeats may be obtained by contacting the Office of Student Aid, 335 Boucke Building. Copies of the Federal Student Assistance Satisfactory Academic Progress Standard are available from the Office of Student Aid at University Park or the Campus Office of Student Programs and Services at the Commonwealth Campuses.

#### SELECTIVE SERVICE REGISTRATION COMPLIANCE

Educational institutions are now required by law to collect a Statement of Registration Compliance from every federal financial aid recipient whether male or female. This attests to their status with the Selective Service. Disbursement of federal financial aid funds cannot occur until the Statement of Registration Compliance is on file with the Office of Student Aid. This requirement applies to NDSL, SEOG, CWSP, Pell, GSL, and PLUS programs.

# ESTIMATED TUITION, ROOM, BOARD, AND OTHER CHARGES

NOTE: The University reserves the right to revise tuition, room, board, and other charges without further notice. Tuition and charges for baccalaureate and graduate programs are listed separately in the Baccalaureate Degree Programs, Graduate Degree Programs, and Capitol Campus bulletins. Penn State has two semesters and a summer session. Students normally attend two semesters per year. The tuition and charges set forth below are estimated. The actual tuition and charges for the 1984-85 and 1985-86 academic years will be established prior to the beginning of the fall semester of each academic year.

TUITION—Tuition per semester for associate degree students in 1983-84:

	Pennsylvanians	Non-Pennsylvanians
12 or more credits:		
University Park Campus	\$1,156.00	\$2,322.00
Commonwealth Campuses	998.00	2,322.00
Behrend College	1,156.00	2,322.00
11 or fewer credits:		
University Park Campus—rate per credit	97.00	194.00
Commonwealth Campuses—rate per credit	75.00	194.00
Behrend College—rate per credit	87.00	194.00

*Enrollment Charge*—All entering students who plan to enroll for 12 or more credits are required to pay a nonrefundable enrollment charge of \$52 upon acceptance of an offer of admission.

*General Deposit*—Undergraduate students are required to make a general deposit of \$50 at the time of admission. This deposit will serve to safeguard the property and equipment used by students in their course of study. It will be retained until a student withdraws or is graduated.

The deposit, less any charges for equipment damages, losses, and forfeitures, will be refunded early in the subsequent semester to the student who has withdrawn or been graduated. The refund will be made by check and mailed to the student's home address. If at any time the balance of the deposit falls below the minimum amount of \$15, the deposit must be replenished.

*Credit by Examination*—A charge of \$15 per credit is made for credit by examination. For evaluation of credits completed elsewhere a charge of \$25 is made for those applying for admission and a charge of \$3 for those who are already matriculated.

*Student Activities*—Student activities charges are determined by elected representatives of the student body, together with a faculty representative.

*Certification and Verification Fee*—A charge of \$2.00 is made for each request for verification or certification of enrollment.

*Change of Schedule Charge*—Unless a change is necessitated by the University, a charge of \$6 is made for each change of schedule after the first five working days of a semester.

*Late Registration Charge*—Unless the delay is unavoidable, \$10 is charged a student who fails to register on the appointed day.

*Other Expenses*—Books and supplies must be secured by the student. These vary from approximately \$125 per semester, depending upon the program.

TERMS OF PAYMENT—Tuition and charges, including room and board, are due and payable in advance of each semester at the Office of the Bursar, 103 Shields Building, University Park, PA 16802. Registration for courses may not be completed until tuition and charges are paid.

Approximately six weeks in advance of each semester, the University will mail to each continuing and newly admitted student of record an estimated bill for tuition and, where applicable,



residence hall charges. Payment by mail is encouraged before the established deadline. The receipt is returned to the student by mail and will permit registration for the designated number of credits. This receipt is likewise authorization to obtain, where applicable, the residence hall key and meal ticket. If checks tendered for payment of tuition and charges are not paid upon presentation to the maker's bank, the student will automatically incur the late payment fee of \$25, and the receipt previously mailed will be considered null and void.

Any student who does not fulfill payment of obligations by the deadline established may be charged the late payment fee of \$25. This charge for late payment also applies to unpaid student supplemental charges. Students whose accounts are delinquent for more than ten days are subject to suspension from the University.

The University reserves the right to withhold transcripts and services to any current or former student who has an unsatisfied financial obligation to the University.

**WITHDRAWALS AND REFUNDS**—Refunds of tuition are based on the effective date of withdrawal from classes.

Charges for tuition are refundable upon withdrawal from the University only in the event the student obtains an official withdrawal form at the office of the dean of his or her college and presents it at the Office of the Registrar not later than one calendar month after the effective date of withdrawal from classes.

In the event of withdrawal, charges for tuition will be refunded under the following policy:

Refund of 80 percent upon withdrawal before the end of the first week of the semester (seventh consecutive calendar day from the first day of classes) and a decrease of 10 percent for each week thereafter up to and including the eighth consecutive calendar week. No amount will be refunded for withdrawal after the eighth consecutive calendar week of the semester.

If a student is enrolled for 12 or fewer credits and drops 1 or more credits, refunds will be determined in accordance with the above policy.

Any refund policy related to adjustments in room and board will be a part of the housing contract.

## MAJORS

### GENERAL DEGREE REQUIREMENTS

There are a number of areas in which a certain level of competence is expected of all recipients of associate degrees. Therefore, all associate degree programs of the University demand the satisfactory completion of the following requirements:

- 3 credits in the social sciences
- 3 credits in the arts and humanities
- 3 credits in English
- 3 credits in speech communication
- 6 credits in the physical sciences, biological science, or mathematics
- 3 credits in any of the above categories; to be determined by the department

**RESERVATIONS**—The University reserves the right to make such program or class changes as may become necessary because of insufficient enrollment or other contingencies. The University also reserves the right to make any necessary changes in tuition and charges without prior notice. Courses and programs described and listed in this bulletin are also subject to change without notice.



AGRICULTURAL BUSINESS (2 AGB)

The Agricultural Business major prepares students for employment in commercial agriculture and businesses serving agriculture. Three options allow students to specialize in either crop or livestock production or in agricultural business, which provides training in management, business organization, and sales.

The first two semesters are offered at selected Commonwealth Campuses where students fulfill basic course requirements in accounting, business, English, and natural and social sciences. The second year at the University Park Campus provides course work in livestock and crop production, management, and agricultural business. As part of the requirements, there are supporting courses in agricultural engineering, farm management, agricultural marketing and sales. Each option allows the student a choice of electives to satisfy special interests and needs.

For the Associate in Science, 68 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 23 credits</b>		
COMMUNICATIONS (6 credits) ENGL 015(3), SPCOM 100(3)	x	—
QUANTIFICATION AND NATURAL SCIENCES (8 credits) BIOL 101(4), 102(4)	x	—
ARTS AND HUMANITIES (3 credits) Selection from University list (3)	x	—
SOCIAL SCIENCES (3 credits) Selection from University list (3)	x	—
GENERAL EDUCATION SELECTION (3 credits) ENGL 201(3) or select 3 credits in speaking or writing	x	—
<b>REQUIREMENTS FOR THE MAJOR: 45 credits</b>		
<b>COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 9 credits</b>		
PRESCRIBED COURSES (9 credits) ACCTG 101(3), B LAW 243(3), CHEM 011(3)	x	—
<b>REQUIREMENTS FOR THE OPTION: 36 credits</b>		
<b>ANIMAL PRODUCTION OPTION: 36 credits</b>		
PRESCRIBED COURSES (18 credits) AG E 214(3), AGRO 028(3), 200(3), AN SC 100(3), 202(3), PTYSC 201(1), 202(2)	—	x
ADDITIONAL COURSES (6 credits) AG EC 101, 106, or 208(3)	—	x
AN SC 007 or 201(3)	—	x
SUPPORTING COURSES AND RELATED AREAS (9 credits) Select 6 credits in agricultural economics	—	x
Select 3 credits in agricultural engineering	—	x
ELECTIVES (3 credits)	—	x
<b>CROP PRODUCTION OPTION: 36 credits</b>		
PRESCRIBED COURSES (18 credits) AG E 214(3), 322(3), AGRO 028(3), 200(3), AG EC 102(3), ENT 012(3)	—	x
ADDITIONAL COURSE (3 credits) AG EC 101, 106, or 208(3)	—	x

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>SUPPORTING COURSES AND RELATED AREAS (6 credits)</b>		
Select 3 credits in animal science or poultry science	—	x
Select 3 credits in horticulture		
<b>ELECTIVES (9 credits)</b>	—	x
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<b>GENERAL OPTION: 36 credits</b>		
<b>PRESCRIBED COURSES (6 credits)</b>		
AG EC 297(3), AGRO 200(3)	—	x
<b>ADDITIONAL COURSES (15 credits)</b>		
AG EC 101 or 208(3); AG EC 102 or 232(3)	—	x
AG EC 106 or 200(3); AGRO 028 or PLTSC 200(3)	—	x
MGMT 100 or MKTG 220(3)	—	x
<b>SUPPORTING COURSES AND RELATED AREAS (12 credits)</b>		
Select 3 credits in agriculture or business	—	x
Select 3 credits in agricultural engineering	—	x
Select 6 credits in animal or poultry science	—	x
<b>ELECTIVES (3 credits)</b>		

## AIR POLLUTION CONTROL ENGINEERING TECHNOLOGY

This major prepares students for positions as air pollution control technicians, working for a local, state, or federal agency. Technicians may be responsible for the calibration, installation, and operation of air sampling and monitoring equipment, investigation of complaints, plant inspections, and source evaluation. As an industrial air pollution control technician, these same responsibilities may be required with the addition of evaluation and monitoring of gas cleaning equipment and performance.

To graduate, 71-72 credits are required.

This program is not currently being offered to entering students.

## ARCHITECTURAL ENGINEERING TECHNOLOGY (2 AET)

This program is designed to provide technically trained personnel between the level of high school graduate and professional architectural engineer or architect to support the architectural design and construction industries. Architectural engineering technicians work under the supervision of a graduate architect or architectural engineer. They translate sketches and design concepts into working drawings and specifications. To do so, they need basic skills in structural and environmental systems design and layout, familiarity with site planning, knowledge of building materials and equipment characteristics and performance, as well as the training in drafting techniques required for the realization of final drawings and specifications. The graduates of this major are prepared for employment in architectural, building engineering, or industrialized housing firms.

Some graduates of this program continue their education by enrolling in the baccalaureate Building Construction Technology, Energy Technology, or Mechanical Design Engineering Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 66-67 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (9 credits)		
MATH 807(5), 808(4)	x	—
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
CMPSC 101(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 42-43 credits</b>		
PRESCRIBED COURSES (37 credits)		
A E 801(2), 802(2), 803(3), 804(3), E G 001(2), E MCH 811(3), PHYS 150(3)	x	—
A E 806(2), 807(3), 810(3), 813(2), 814(3), 815(3), PHYS 151(3)	—	x
ADDITIONAL COURSES (5-6 credits)		
Select 5-6 credits from the following technical courses: A E 812, 830, CHEM 011, C E 861, CMPSC 102, E E 800, E G 012, 803, 830, E MCH 813, I E 805, MATH 140, 141, 231, 250, M E 807, 881, S T 801, or 830	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

BIOMEDICAL EQUIPMENT TECHNOLOGY (2 BET)

During the past several decades, the medical community has grown to depend increasingly on machines for the delivery of quality health care. Biomedical equipment technicians are men and women responsible for maintaining these machines in accurate and safe working order. Their tasks include functional and safety inspecting, preventive maintenance, calibration, trouble-shooting, and repair of this equipment. In addition, they may be involved in equipment control programs, in electrical safety assurance programs, and in training hospital personnel in the safe and proper use of the equipment. The classroom and laboratory portions of this program focus on electronically-based patient monitoring equipment. The student is, however, exposed to a much broader spectrum of biomedical equipment through a ten-week practical internship in an approved health care facility.

Some graduates of this program continue their education by enrolling in the baccalaureate Electrical Design Engineering Technology program offered at Penn State's Capitol Campus. Graduation from this program further expands the choices of employment.

For the Associate in Engineering, 72 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4	Summer
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 015*(3)	x	—	—
SPCOM 100(3)	—	x	—
QUANTIFICATION AND NATURAL SCIENCES (9 credits)			
MATH 807(5), 808(4)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	x	—
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	x	—
GENERAL EDUCATION SELECTION (3 credits)			
CMPS C 101(3)	x	—	—
<b>REQUIREMENTS FOR THE MAJOR: 48 credits</b>			
PRESCRIBED COURSES (45 credits)			
E E 801(4), 805(1), 809(1), 810(3), 814(3), 818(2), E G 001(2)	x	—	—
BIOL 041(3), CHEM 011(3), PHYS 150(3), 151(3)	x	x	—
B E T 801(5), 802(5), 804(3)	—	x	—
B E T 803(4)	—	—	x
ADDITIONAL COURSE (3 credits)			
Select 3 credits from the following technical courses: B E T 830, BIOL 029, CH E 831, C E 861, CMPS C 102, E E 811, 813, 817, 830, E G 803, E MCH 811, I E 315, MATH 140, 141, 231, or M E 807	—	x	—

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

## BUSINESS ADMINISTRATION (2 B A)

This two-year, college-level academic program is designed to provide instruction in business administration that fulfills the requirements of various levels of responsibility higher than that held by high school graduates.

The primary objective of this major is to provide a managerially-oriented program with sufficient communicative and mathematical skills, socially relevant course work, and advanced courses in specific business specialties to develop a well-rounded graduate.

For the Associate in Science, 68 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 004*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		

\*Students who exempt ENGL 004 may substitute 3 credits of electives.



	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
MATH 005(3)	x	—
Select 3 credits in natural sciences	x	—
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 826(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 47 credits</b>		
<b>PRESCRIBED COURSES (24 credits)</b>		
ACCTG 801(3), 802(3), B LAW 243(3), ENGL 015(3), FIN 297(3), MGMT 100(3), M I S 800(3), MKTG 221(3)	x	x
<b>ADDITIONAL COURSES (21 credits)</b>		
Q B A 101 or 801(3)	x	—
ECON 002, 004, or 014#(3)	—	x
Select 15 credits from ACCTG 803, 806, 807, 810, B A 250, 803, B LAW 850, B LOG 301, 304, 305, CMPSC 102, 140, 803, 890, ECON 002 +, 004 +, FIN 108, 807, 810, INS 102, 810, 820, 830, I B 862, L S 100, M I S 800, MGMT 801, 802, MKTG 220, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, Q B A 102, R EST 100, 810, or 830	—	x
<b>SUPPORTING COURSES AND RELATED AREAS (2 credits)</b>		
Select 2 credits in physical education	x	x

#Students going on to a four-year program should not take ECON 014.  
+ Select the course not taken above.

CHEMICAL ENGINEERING TECHNOLOGY (2CHET)

This major prepares students for positions as assistants to chemists, chemical engineers, and petroleum engineers, assistants in research and control laboratories, and trainees for future supervisory positions in manufacturing and production. Graduates of the major have a reasonable proficiency in basic sciences (chemistry, mathematics, and physics), communication skills, and the basic principles of chemical engineering technology.

Some graduates of this program continue their education by enrolling in the baccalaureate Energy Technology or Water Resources Engineering Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 68-69 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
<b>COMMUNICATIONS (6 credits)</b>		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<hr/>		
QUANTIFICATION AND NATURAL SCIENCES (9 credits)		
MATH 807(5), 808(4)	x	—
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ARTS AND HUMANITIES (3 credits)		
Select 3 credits in humanities	—	x
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SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
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GENERAL EDUCATION SELECTION (3 credits)		
CMPSC 101(3)	x	—
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REQUIREMENTS FOR THE MAJOR: 44-45 credits		
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PREScribed COURSES (39-40 credits)		
E G 001(2), PHYS 150(3)	x	—
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CHEM 012(3-4), 013(3), 014(1), 015(1), 023(4), 034(3), PHYS 151(3)	x	x
CH E 810(4), 811(5), 821(2), 822(2), 830(3)	—	x
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ADDITIONAL COURSES (5 credits)		
Select 5 credits from the following technical courses: BI SC 003, BIOL 041, 101, CH E 831, CHEM 035, CMPSC 102, E G 803, 830, E MCH 811, I E 315, 805, MATH 140, 141, 231, 250, METEO 003, or MICRB 106	—	x

CLINICAL HEALTH SERVICES (2 CHS)

The goal of this program is to educate students to assist physicians in providing health care to patients in a primary-care setting.

The program is twenty-one months in length, with two semesters of work in the basic and clinical sciences, one semester (the summer session between the first and second academic year) of activity in the area of categorical clinical experiences, with the final two semesters being spent in a preceptorship in a primary-care environment. Upon completion of the program, the student may take the National Certification Examination for physician assistants.

Admission requirements include 60 undergraduate credits from a regionally approved college or university, or equivalent, including a 3-credit college-level course in each of the following: English composition, speech communication, humanities, anatomy and physiology, biology, mathematics, microbiology, sociology, and psychology.

For more information, write to The Milton S. Hershey Medical Center, 500 University Drive, Hershey, PA 17033.

For the Associate in Science in Clinical Health Services, 72 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4	5-6
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GENERAL DEGREE REQUIREMENTS: 21 credits			
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COMMUNICATIONS (6 credits)			
Students are admitted with advanced standing			
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QUANTIFICATION AND NATURAL SCIENCES (6 credits)			
Students are admitted with advanced standing			
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ARTS AND HUMANITIES (3 credits)			
Students are admitted with advanced standing			

COMMUNITY SERVICES

<i>Scheduling Recommendation by Semester Standing</i>			
	1-2	3-4	5-6
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SOCIAL SCIENCES (3 credits)			
Students are admitted with advanced standing			
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GENERAL EDUCATION SELECTION (3 credits)			
Students are admitted with advanced standing			
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REQUIREMENTS FOR THE MAJOR: 72 credits			
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PRESCRIBED COURSES (72 credits)			
P A 800(7), 801(7), 805(1), 810(3), 820(3),			
821(3), 840(2), 841(2), 850(3), 870(1),			
871(1)			
	x	—	—
P A 878(9), 880(15)	—	x	—
P A 881(15)	—	—	x

COMMUNITY SERVICES (2ECSV)

The Community Services major is designed to provide entry-level professional competency in one of several human service fields. The objective of the major is to provide a general education background, a knowledge base in human development, and a core of professional skills in a particular human services area. Challenges, issues and problems, current approaches and procedures, and elements of program planning and services provision are studied. The major has three options.

The Administration of Justice option is designed to prepare persons for career roles in police departments, probation and parole agencies, and correctional institutions.

The Adult Development and Aging option is designed to prepare persons for a wide variety of service roles in boarding homes, nursing homes, area agencies on aging, senior citizen centers, and other sites which provide services for the elderly.

The Child and Youth Services option is designed to prepare persons for a wide variety of service roles in day and institutional child care agencies, preschools, head start centers, and other child and youth service settings.

The Community Services major includes one semester of field experience in a local community agency.

For the Associate in Science, 62 credits are required.

<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4
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GENERAL DEGREE REQUIREMENTS: 21 credits		
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COMMUNICATIONS (6 credits)		
ENGL 015(3), SPCOM 100(3)	x	—
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QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
Selections from University list (6)	x	—
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ARTS AND HUMANITIES (3 credits)		
Selection from University list (3)	x	—
<hr/>		
SOCIAL SCIENCES (3 credits)		
Selection from University list (3)	x	—
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GENERAL EDUCATION SELECTION (3 credits)		
ENGL 201, 211, 218, or 219(3)	x	—

*Scheduling Recommendation  
by Semester Standing*  
1-2                      3-4

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**REQUIREMENTS FOR THE MAJOR: 41 credits**


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**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 15 credits**


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**PRESCRIBED COURSES (7 credits)**

H DEV 100(1), 101(3), 102(3)	x	—
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**ADDITIONAL COURSES (8 credits)**

ADM J 395* or H DEV 395*(8)	—	x
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**REQUIREMENTS FOR THE OPTION: 26 credits**


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**ADMINISTRATION OF JUSTICE OPTION: 26 credits**
**PRESCRIBED COURSES (11 credits)**

ADM J 111(3)	x	—
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ADM J 221(3), 240(1), 241(2), 394(1), 396(1)	—	x
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**SUPPORTING COURSES AND RELATED AREAS (15 credits)**

Select 15 credits of professional electives in consultation with adviser	—	x
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**ADULT DEVELOPMENT AND AGING OPTION: 26 credits**
**PRESCRIBED COURSES (14 credits)**

I F S 349(3)	x	x
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H DEV 395*(4), I F S 297(4), 315(3)	—	x
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**ADDITIONAL COURSE (3 credits)**

Select 3 credits from I F S 318, 319, or NUTR 251	—	x
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**SUPPORTING COURSES AND RELATED AREAS (9 credits)**

Select 9 credits of professional electives in adult development and aging in consultation with adviser	—	x
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**CHILD AND YOUTH SERVICES OPTION: 26 credits**
**PRESCRIBED COURSES (11 credits)**

I F S 297(6), 330(1), H DEV 395*(4)	—	x
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**ADDITIONAL COURSES (6 credits)**

I F S 329 or 339(3)	x	—
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I F S 315 or 319(3)	—	x
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**SUPPORTING COURSES AND RELATED AREAS (9 credits)**

Select 9 credits of professional electives in child services and child development in consultation with adviser	—	x
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\*Guidelines for Field Placement include:

1. Agencies utilized are local agencies.
2. Priority for placement is made for students with higher semester standings.
3. Prerequisites for placement include for Administration of Justice — ADM J 111, H DEV 102; for Adult Development and Aging — H DEV 101, 349; for Child and Youth Services — H DEV 101; I F S 329 or 339.

## COMPUTER SCIENCE (2CPSC)

The primary objective of this program is to prepare graduates for immediate and continuing employability as application programmers, associate systems designers, or associate systems programmers.

To meet this objective the program is designed to ensure a thorough knowledge of the techniques of programming general-purpose digital computers, and includes extensive practice—using contemporary programming technologies—in the analysis, organization, validation, and



## DIETETIC FOOD SYSTEMS MANAGEMENT

documentation of effective computer code. The program also includes practical knowledge of the logical organization of modern digital computers and related peripheral equipment, the structure of operating systems and compilers, and considerations in the design of information systems.

The General Education Requirements provide the student with an extension to the basic educational foundation. The General Requirements for the Major give the graduate technical competence in the computing and data processing field. The Application Specialization provides a practical knowledge of an area of application within which the graduate may profitably utilize the acquired computing talent.

For the Associate in Science, 63 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
MATH 017(3), 018(3)	x	—
ARTS AND HUMANITIES (3 credits)	—	x
SOCIAL SCIENCES (3 credits)	—	x
GENERAL EDUCATION SELECTION (3 credits)		
Select 3 credits in Q B A or STAT	x	—
<b>REQUIREMENTS FOR THE MAJOR: 42 credits</b>		
PRESCRIBED COURSES (28 credits)		
CMPS 100(3), 101(3), 102(3), 140(3), ENGL 218(3)	x	—
CMPS 144(4), 154(3), 164(3), 805(3)	—	x
SUPPORTING COURSES AND RELATED AREAS (14 credits)		
Technical specialization and related work (12)	x	x
Select 2 credits in physical education	—	x

## DIETETIC FOOD SYSTEMS MANAGEMENT (2EDSM)

The purpose of this major is to prepare food systems management dietetic technicians for middle management positions in the food service area of health care facilities or community feeding operations. Candidates for admission to this major must be employed at least fifteen hours a week in a health care facility food service operation where their work is supervised by a registered dietitian. Graduates become eligible for technician membership in the American Dietetic Association.

Students who meet admission criteria are admitted to the extended degree major in Dietetic Food Systems Management. The required courses are available primarily through correspondence study offered by the Department of Independent Learning.

Students who achieve outstanding records may, upon completion of this major, apply for admission to the Management Dietetics option of the baccalaureate degree major in Hotel, Restaurant, and Institutional Management in the College of Human Development. Five additional semesters of satisfactory work are required to earn the baccalaureate degree.

For the Associate in Science, 68 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015(3), SPCOM 100(3)	x	—

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>QUANTIFICATION AND NATURAL SCIENCES (6 credits)</b>		
MATH 035, STAT 200, or CMPSC 101(3)	x	—
BIOL 041(3)	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
SOCIAL SCIENCES (3 credits)		
SOC 001 or 003(3)	x	—
<b>GENERAL EDUCATION SELECTION (3 credits)</b>		
ECON 002, 004, or 014(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 47 credits</b>		
<b>PRESCRIBED COURSES (32 credits)</b>		
D S M 100(1), 103(3), 250(4), 260(4), 295(4), 304(3), HR&IM 225(3), H P A 101(3), H F S 802(3), NUTR 252(4)	x	x
<b>ADDITIONAL COURSES (12 credits)</b>		
ACCTG 101 or 801(3)	x	x
EDPSY 014 or 297(3)	x	x
D S M 205 or MGMT 321 or 341(3)	x	x
NUTR 251 or 801(3)	x	x
<b>SUPPORTING COURSES AND RELATED AREAS (3 credits)</b>		
Select 3 credits in consultation with the student's adviser to develop competence as a dietetic practitioner	x	x

## ELECTRICAL ENGINEERING TECHNOLOGY (2 EET)

This major prepares graduates for technological service with manufacturers of electrical, electronic, and computer equipment; electrical utilities; and electrical maintenance and instrumentation departments of various industrial concerns. The principal objective is to provide a practical knowledge of electronic, digital, and microprocessor theory as well as electrical machinery and its application.

Some graduates of this program continue their education by enrolling in the baccalaureate Electrical Design Engineering Technology or Energy Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 70-71 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
<b>COMMUNICATIONS (6 credits)</b>		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (9 credits)</b>		
MATH 807(5), 808(4)	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
Select 3 credits in arts or humanities	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
CMPSC 101(3)	x	—
REQUIREMENTS FOR THE MAJOR: 46-47 credits		
PRESCRIBED COURSES (44 credits)		
E G 001(2), E E 801(4), 805(1), 809(1), 810(3), 814(3), 818(2), PHYS 150(3)	x	—
E E 804(2), 806(1), 811(3), 813(3), 815(3), 816(3), 817(4), 819(1), 820(1), 821(1), PHYS 151(3)	—	x
ADDITIONAL COURSES (2-3 credits)		
Select 2-3 credits from the following technical courses: BI SC 003, CHEM 011, 012, C E 861, CMPSC 102, E E 830, E G 003, 803, 830, E MCH 810, 811, I E 315, 805, MATH 140, 141, 231, M E 800, or 807	—	x

FOREST TECHNOLOGY (2FORT)

The objectives of this major are to train students in the techniques that are basic to planning, organizing, and managing forestry enterprises and to provide a program of general studies which will serve as a foundation for future intellectual growth. It is intended that graduates will act in a supporting capacity to professional foresters.

For the Associate in Science, 68-70 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
GENERAL DEGREE REQUIREMENTS: 21 credits			
COMMUNICATIONS (6 credits)			
ENGL 015(3), SP/COM 100(3)	x	—	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)			
MATH 807(5)	x	—	—
FOR 821(1)	—	x	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	—	x
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	—	x
GENERAL EDUCATION SELECTION (3 credits)			
ENGL 826(3)	—	—	x
REQUIREMENTS FOR THE MAJOR: 47-49 credits			
PRESCRIBED COURSES (41 credits)			
FOR 240(3), 250(3), 804(3), 824(1), 840(2), 806(3), 825(1), 841(4)	x	—	—
FOR 820(1), 822(1), 827(1)	—	x	—
ACCTG 016(3), FOR 220(3), 221(1), 241(4), 242(3), 809(3), 814(1)	—	—	x

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>ADDITIONAL COURSES (6-8 credits)</b>			
Group I†			
Select 6 credits from FOR 807(3), 817(3), or WILDL 801(3)	—	—	x
Group II‡			
FOR 828(1), 829(3), 830(3), 831(1)	x	x	x

†Students whose interests are primarily in land management should schedule two courses from Group I.

‡Students with an interest in sawmilling should take all courses in Group II.

## HIGHWAY ENGINEERING TECHNOLOGY (2 HET)

This major prepares highway construction technicians to perform many of the planning and design tasks necessary in the construction of highways, railroads, bridges, and airports. In the planning stages of construction, a highway construction technician may be engaged in estimating costs, purchasing materials, preparing specifications, computing fills, cuts, and drainage requirements, drafting, designing, or surveying. During actual construction such technicians may perform supervisory functions and inspection.

Some graduates of this program continue their education by enrolling in the baccalaureate Building Construction Technology or Transportation Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 69 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (9 credits)		
MATH 807(5), 808(4)	x	—
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
CMPSC 101(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 45 credits</b>		
PREScribed COURSES (45 credits)		
C E 809(2), 811(3), 812(3), 818(2), E G 001(2), ENGL 826(3), PHYS 150(3)	x	—
C E 814(3), 821(3), 822(3), 823(3), 824(3), 825(3), E MCH 811(3), 813(3), PHYS 151(3)	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015. ENGL 218 or 826 is required for all students in the program.



HOTEL AND FOOD SERVICE (2 HFS)

This is an intensive four-semester major designed to prepare students for managerial positions in the hospitality industry. The course of study places heavy reliance on experience acquired in an on-the-job setting.

Students who achieve outstanding records may, upon completing this program, apply for admission to the baccalaureate degree program in Hotel, Restaurant, and Institutional Management in the College of Human Development. Six additional semesters of satisfactory work are required to earn the baccalaureate degree.

For the Associate in Science, 65 credits are required.

			<i>Scheduling Recommendation by Semester Standing</i>	
			1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>				
COMMUNICATIONS (6 credits)				
ENGL 015(3), SPCOM 100(3)		x		—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)				
Select 6 credits from University list		x		—
ARTS AND HUMANITIES (3 credits)				
Select 3 credits from University list		x		—
SOCIAL SCIENCES (3 credits)				
Select 3 credits in Economics		x		—
GENERAL EDUCATION SELECTION (3 credits)				
Select 3 credits from ENGL 201, 211, 218, or 219		x		—
<b>REQUIREMENTS FOR THE MAJOR: 44 credits</b>				
PRESCRIBED COURSES (21 credits)				
HR & IM 102(2)		x		—
HR & IM 225(3), 295(1), H F S 804(3), 850(4), 860(4), 870(4)		—		x
ADDITIONAL COURSE (3 credits)				
Select 3 credits in accounting		—		x
SUPPORTING COURSES AND RELATED AREAS (20 credits)				
Select 20 credits in consultation with adviser to develop a competency in management or general business administration		x		x

LABOR STUDIES (2ELBR)

The purpose of this program is to help employees improve their understanding and competence in coping with personal, group, and organizational problems at their worksites, in relationships with employers, and in transactions with the community, the economy, and the polity. The program consists of a core of labor courses supplemented by introductory liberal arts studies which provide (1) basic communication skills, (2) conceptual tools of analysis, and (3) a more general cultural context for the examination of labor problems.

For the Associate in Arts, 60 credits are required.

			<i>Scheduling Recommendation by Semester Standing</i>	
			1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>				
COMMUNICATIONS (6 credits)				
		x		—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)				
		x		—
ARTS AND HUMANITIES (3 credits)				
		x		—

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
SOCIAL SCIENCES (3 credits)	x	—
GENERAL EDUCATION SELECTION (3 credits)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 39 credits</b>		
<b>PRESCRIBED COURSES (18 credits)</b>		
L S 100(3), 102(3), 103(3), 104(3), 156(3), 296(3)	x	x
<b>SUPPORTING COURSES AND RELATED AREAS (21 credits)</b>		
Select 21 credits from the following areas in consultation with adviser: economics, history, industrial engineering, journalism, labor studies, management, political science, psychology, sociology		
	x	x

## LETTERS, ARTS, AND SCIENCES# (2 LAS)

The objectives of this program are to broaden the student's understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student's interests or career plans. This program is a complete two-year degree program. However, graduates who later seek admission to baccalaureate programs may apply baccalaureate credits toward the new degree. Any 800-level credits taken in the Letters, Arts, and Sciences program are not applicable toward most baccalaureate degrees.

For the Associate in Arts, 60 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
<b>COMMUNICATIONS (6 credits)</b>		
ENGL 015*(3), SPCOM 100(3)	x	—
<b>QUANTIFICATION AND NATURAL SCIENCES (6 credits)</b>		
Select 3 credits in mathematics (MATH 004 not acceptable), statistics, computer science, or philosophy (PHIL 012 and 212 only) +		
	x	x
Select 3 credits in any courses designated as physical, biological, or earth sciences +		
	x	x
<b>ARTS AND HUMANITIES (3 credits)</b>		
Select 3 credits in any courses designated as arts +		
	x	x

#The 45 required and related credits must be baccalaureate-level courses. For those intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a Bachelor of Arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken since admission to a Bachelor of Arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

\*Students will be placed in ENGL 004, 015, or 030 on the basis of English Placement Test scores. If a student is placed in ENGL 030, successful completion of that course will satisfy the English 015 requirement. Students must take ENGL 201, 211, 218, or 219 as part of the General Education Selection of the major.

+Courses which will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checklist, which may be obtained from the College of the Liberal Arts associate dean for undergraduate studies at the University Park Campus or from any Letters, Arts, and Sciences representative at the Commonwealth Campuses.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<hr/>		
SOCIAL SCIENCES (3 credits)		
Select 3 credits in any courses designated as social and behavioral sciences +	x	x
<hr/>		
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 201, 211, 218, or 219(3)	x	x
<hr/>		
REQUIREMENTS FOR THE MAJOR: 39 credits		
<hr/>		
PRESCRIBED COURSES (None)		
<hr/>		
SUPPORTING COURSES AND RELATED AREAS (24 credits)		
Select 3 credits in any courses designated as arts +	x	x
Select 6 credits in any courses designated as humanities +	x	x
Select 3 credits in any courses designated as social and behavioral sciences +	x	x
Select 3 credits in any courses designated as physical, biological, or earth sciences +	x	x
Select 9 credits in any one of the following areas: + arts, humanities, social and behavioral sciences, natural sciences and quantification, and foreign language skills. (If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.)	x	x
<hr/>		
ELECTIVES (15 credits)	x	x

+ Courses which will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the College of the Liberal Arts associate dean for undergraduate studies at the University Park Campus or from any Letters, Arts, and Sciences representative at the Commonwealth Campuses.

MECHANICAL ENGINEERING TECHNOLOGY (2 MET)

This major is intended to prepare detail or layout draftsmen and junior designers for manufacturing industries as well as for the many concerns engaged in installation or erection work. The principal objective is to prepare young men and women for employment in machine design, tool and die design, or structural layout. Some graduates are involved in technical or industrial sales, become supervisors in light and heavy industry, or enter management trainee programs.

Some graduates of this program continue their education by enrolling in the baccalaureate Building Construction Technology, Mechanical Design Engineering Technology, Transportation Technology, or Water Resources Engineering Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 67-68 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<hr/>			
GENERAL DEGREE REQUIREMENTS: 24 credits			
<hr/>			
COMMUNICATIONS (6 credits)			
ENGL 015*(3)	x	—	—
SPCOM 100(3)	—	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
QUANTIFICATION AND NATURAL SCIENCES (9 credits)			
MATH 807(5), 808(4)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	—	x
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	—	x
GENERAL EDUCATION SELECTION (3 credits)			
CMPSC 101(3)	x	—	—
REQUIREMENTS FOR THE MAJOR: 43-44 credits			
PREScribed COURSES (38 credits)			
E G 001(2), 012(2), E MCH 811(3), I E 811(3), PHYS 150(3)	x	—	—
I E 812(3)	—	x¶	—
A E 809(3), E G 803(3), E MCH 813(3), 814(1), I E 815(3), M E 805(3), 810(3), PHYS 151(3)	—	—	x
ADDITIONAL COURSES (5-6 credits)			
Select 5-6 credits from the following technical courses: BI SC 003, CHEM 011, 012, C E 861, CMPSC 102, E E 800, E G 003, 830, E MCH 812, I E 315, 805, MATH 140, 141, 231, 250, M E 807, or 830	—	—	x

¶To be taken at a regional campus.

## MEDICAL LABORATORY TECHNOLOGY (2 MLT)

This two-calendar-year program (four semesters, two summer sessions) is designed to provide the necessary general and technical training for hospital personnel between the level of the medical laboratory technician (certificate program) and the medical technologist (baccalaureate program). The course of study includes one year of intensive clinical experience at an affiliated hospital and the theoretical background necessary for the clinical procedures performed by the certified medical laboratory technician (associate degree program). Upon completion of program requirements, the student receives the associate degree and is eligible to sit for examinations leading to certification and registry as a medical laboratory technician.

The program begins in the summer session.

For the Associate in Science, 71-72 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	Summer	1-2	3-4
GENERAL DEGREE REQUIREMENTS: 21 credits			
COMMUNICATIONS (6 credits)			
ENGL 015(3), SPCOM 100(3)	x	—	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)			
MATH 004 or 005(3)	x	—	—
BIOL 041(3)	—	x	x
ARTS AND HUMANITIES (3 credits)			
Selection from University list (3)	x	—	—
SOCIAL SCIENCES (3 credits)			
Selection from University list (3)	x	x	—



	<i>Scheduling Recommendation by Semester Standing</i>		
	Summer	1-2	3-4
<b>GENERAL EDUCATION SELECTION (3 credits)</b>			
Select 3 credits in social and behavioral sciences from University list	x	x	—
<b>REQUIREMENTS FOR THE MAJOR: 50-51 credits</b>			
<b>PRESCRIBED COURSES (50-51 credits)</b>			
MICRB 150(4)	x	—	—
CHEM 012(3-4), 014(1), 034(3), BIOL 029(4), 042(1), CMPSC 001(1), MICRB 201(3), 202(2)	—	x	—
MICRB 151A(9), 151B(6), 151C(6), 151D(5), 151E(2)	—	—	x

**METALLURGICAL ENGINEERING TECHNOLOGY  
(2METE)**

This program prepares students for positions in the metallurgical and metals-oriented industries as technical personnel in research laboratories and in quality control, and as supervisors of service groups and of production operations.

For the Associate in Engineering, 72 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 23 credits</b>		
<b>COMMUNICATIONS (6 credits)</b>		
ENGL 004 or 015(3)	x	—
SPCOM 100(3)	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (8 credits)</b>		
MATH 807(5), CHEM 011(3)	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
Selection from University list (3)	—	x
<b>SOCIAL SCIENCES (3 credits)</b>		
Selection from University list (3)	—	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>		
Select 3 credits in Economics	—	x
<b>REQUIREMENTS FOR THE MAJOR: 49 credits</b>		
<b>PRESCRIBED COURSES (43 credits)</b>		
CHEM 012(3), 014(1), E G 001(2), MATH 808(4), MET E 800(4), PHYS 150(3), 151(3)	x	—
CMPSC 101(3), E E 800(2), I E 809(3), MET E 801(2), 802(3), 803(3), 804(3), 805(3), 807(1)	—	x
<b>ADDITIONAL COURSES (6 credits)</b>		
ENGL 201 or 826(3)	x	—
I E 812 or MET E 806(3)	x	—

**MINING TECHNOLOGY (2MNGT)**

For the Associate in Science, 72 credits are required.

*Scheduling Recommendation  
by Semester Standing*  
1-2                      3-4

**GENERAL DEGREE REQUIREMENTS: 23 credits**

**COMMUNICATIONS (6 credits)**

ENGL 015(3)	x	—
SPCOM 100(3)	—	x

**QUANTIFICATION AND NATURAL SCIENCES (8 credits)**

MATH 807(5), CHEM 011(3)	x	—
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**ARTS AND HUMANITIES (3 credits)**

Selection from University list (3)	—	x
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**SOCIAL SCIENCES (3 credits)**

ECON 014(3)	x	—
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**GENERAL EDUCATION SELECTION (3 credits)**

GEOSC 001 or 020(3)	x	—
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**REQUIREMENTS FOR THE MAJOR: 49 credits**

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 25 credits**

**PRESCRIBED COURSES (25 credits)**

CMPSC 101(3), E G 001(2), E MCH 811(3), MATH 808(4), PHYS 150(3)	x	—
MNG T 800(1), 804(3), 806(3)	x	x
ENGL 826(3)	—	x

**REQUIREMENTS FOR THE OPTION: 24 credits**

**MAINTENANCE OPTION: 24 credits**

**PRESCRIBED COURSES (24 credits)**

MGMT 100(3), MNG T 801(3), 802(3), 807(3), 808(3), 809(3), 810(3), 811(3)	—	x
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**PRODUCTION OPTION: 24 credits**

**PRESCRIBED COURSES (21 credits)**

MN PR 061(3), MNG 023(3), 030(3), MNG T 801(3), 802(3), 803(3), 805(3)	—	x
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**SUPPORTING COURSES AND RELATED AREAS (3 credits)**

Select 3 credits in mining technology	—	x
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**SURFACE MINING OPTION: 24 credits**

**PRESCRIBED COURSES (21 credits)**

MN PR 061(3), MNG 023(3), MNG T 815(3), 816(3), 817(3), 818(3), 819(3)	—	x
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**SUPPORTING COURSES AND RELATED AREAS (3 credits)**

Select 3 credits in mining technology	—	x
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## NUCLEAR ENGINEERING TECHNOLOGY (2 NET)

This major is designed to provide technically trained personnel to support the rapidly developing nuclear industry. The wide scope of training prepares the nuclear technician for careers in radiation safety, reactor operations, radioisotope handling, nuclear and control instrumentation, fuel fabrication, and health physics. A nuclear technician may work as a radiological safety specialist, engineering aide, or enter training as a reactor operator at a nuclear facility.

Some graduates of this program continue their education by enrolling in the baccalaureate Electrical Design Engineering Technology or Energy Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Nuclear Engineering Technology, 70 credits are required.

## PHYSICAL THERAPIST ASSISTANCE

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (9 credits)		
MATH 807(5), 808(4)	x	—
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
CMPS 101(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 46 credits</b>		
PRESCRIBED COURSES (46 credits)		
ENGL 826(3), E E 801(4), 809(1), 814(3), E G 001(2)	—	x
CHEM 011(3), PHYS 150(3), 151(3)	x	x
M E 807(3), NUC E 801(2), 802(4), 805(3)	—	x
NUC E 803(3), 804(3), 812(3), 814(3)	—	x¶

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015. ENGL 218 or 826 is required for all students in the program.

¶To be taken at University Park Campus.

## PHYSICAL THERAPIST ASSISTANCE (2 PTA)

The Physical Therapist Assistance program is designed to provide an opportunity for interested students to develop knowledge and skills in the principles of physical therapy techniques, appropriate use of equipment associated with various physical therapy treatment modalities, and the basic diagnostic approaches necessary for adequate rehabilitation programming efforts. In order to accomplish these tasks, the program utilizes a combination of basic science and nonscience course work coupled with appropriate clinical experiences.

To enter the program, students must have a high school diploma and satisfactory Scholastic Aptitude Test scores. The size of each entering class must be limited to ten students so that optimal clinical experiences and practical application situations can be maintained. Close, personal supervision is essential for total program integrity.

For the Associate in Science, 65 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4	5
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 004 or 015(3)	x	—	—
SPCOM 100A(3)	—	x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)			
MATH 017(3), BI SC 001(3)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in humanities	—	x	—

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4	5
SOCIAL SCIENCES (3 credits)			
SOC 001(3)	—	x	—
GENERAL EDUCATION SELECTION (3 credits)			
ENGL 015, 201, or 218(3)	x	x	—
<b>REQUIREMENTS FOR THE MAJOR: 44 credits</b>			
PREScribed COURSES (43 credits)			
BIOL 029(4), HL ED 800(3), 807(1), PH SC 007(3), PSY 002(3)	x	—	—
BIOL 041(3), 042(1), HL ED 384(3), 801(4), 803(3), 804(3)	—	x	—
HL ED 805(2), 806(10)	—	—	x
SUPPORTING COURSES AND RELATED AREAS (1 credit)			
Select 1 credit in HL ED or PH ED	x	—	—

## RAILWAY ENGINEERING TECHNOLOGY (2 RET)

The objective of this program is to prepare railway technicians for the revitalized railway industry. Such individuals will be able to run surveys, solve right-of-way and drainage problems, deal with track layout and maintenance problems, and work with basic railway structures. Graduates of the Railway Engineering Technology program may find employment as track foremen, track supervisors, track inspectors, or management trainees with the American railroads; as track inspectors with the Federal Railroad Administration; or as designers and estimators with consulting engineers.

Some graduates of this program continue their education by enrolling in the Building Construction Technology or Transportation Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 68-69 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 015*(3)	x	—	—
SPCOM 100(3)	—	—	x
QUANTIFICATION AND NATURAL SCIENCES (9 credits)			
MATH 807(5), 808(4)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	—	x
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	—	x
GENERAL EDUCATION SELECTION (3 credits)			
CMPSC 101(3)	x	—	—

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.



	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>REQUIREMENTS FOR THE MAJOR: 44-45 credits</b>			
<b>PRESCRIBED COURSES (42 credits)</b>			
C E 809(2), 811(3), 812(3), 818(2), E G 001(2), PHYS 150(3), 151(3)	x	—	x
C E 813(4)	—	x	—
C E 840(3), 841(3), 842(3), 843(3), E E 800(2), E MCH 811(3), 813(3)	—	—	x
<b>ADDITIONAL COURSES (2-3 credits)</b>			
Select 2-3 credits from the following technical courses: C E 822, 823, 824, 825, 830, 861, CHEM 011, 012, CMPSC 102, E E 800, E G 803, 830, I E 315, 805, MATH 140, 141, 231, M E 800, or 807			
	—	—	x

SCIENCE (2 SC)

This major is primarily designed to provide for the basic educational needs of students who desire to pursue professional programs as outlined by medical accrediting societies. The program provides a fundamental group of science courses of value to those who seek positions in government or industry where such knowledge is necessary or desirable.

For the Associate in Science, 66 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
<b>COMMUNICATIONS (6 credits)</b>		
ENGL 015(3), SPCOM 100(3)	x	—
<b>QUANTIFICATION AND NATURAL SCIENCES (6 credits)</b>		
MATH 007(3), CHEM 011(3)	—	x
<b>ARTS AND HUMANITIES (3 credits)</b>		
	x	x
<b>SOCIAL SCIENCES (3 credits)</b>		
	x	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>		
Select 3 credits in social and behavioral sciences	x	x
<b>REQUIREMENTS FOR THE MAJOR: 45 credits</b>		
<b>PRESCRIBED COURSES (27 credits)</b>		
BIOL 029(4), 101(4), MATH 110(4), PHYS 150(3)	x	—
BIOL 041(3), CMPSC 101(3), MICRB 106(2), 107(1), PHYS 151(3)	—	x
<b>ADDITIONAL COURSES (15 credits)</b>		
CHEM 034 or BIOCH 001(3)	—	x
Select 12 credits from the following biological, mathematical, and physical science courses:		
ASTRO 001(3), BIOL 033(3), 042(1), 102(4), BI SC 003(3), CHEM 035(3), 102(3), MATH 111(2), PHIL 212(3), PHYS 297(3), or STAT 200(4)	x	x
<b>SUPPORTING COURSES AND RELATED AREAS (3 credits)</b>		
Select 3 credits from arts and humanities	x	x

## SCIENCE

### Radiologic Technologist Radiographer Option

This option is a twenty-seven-month program and requires seven semesters (five semesters plus two summer sessions).

For graduation, 66 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>			
	1-2	3-4	5-6	7
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>				
COMMUNICATIONS (6 credits)				
ENGL 015(3)	x	—	—	—
SPCOM 100(3)	—	x	—	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)				
MATH 005(3), CHEM 011(3)	x	—	—	—
ARTS AND HUMANITIES (3 credits)				
Select 3 credits in arts or humanities	—	x	—	—
SOCIAL SCIENCES (3 credits)				
Select 3 credits in social sciences	x	x	—	—
GENERAL EDUCATION SELECTION (3 credits)				
Select 3 credits in social and behavioral sciences	x	x	—	—
<b>REQUIREMENTS FOR THE OPTION: 45 credits</b>				
PRESCRIBED COURSES (45 credits)				
BIOL 029(4), 101(4), HUMAN 101(3), MATH 006(3), PHYS 150(3)	x	—	—	—
BIOL 033(3), 041(3), CMPSC 100(3), PHYS 151(3), 297(3), R T R 1(1), 20(1), 30(1)	—	x	—	—
R T R 40(5), 50(1), 60(1)	—	—	x	—
R T R 70(1), 80(1), 90(1)	—	—	—	x

## SOCIOLOGY (2ESOC)

This major introduces students to the study of human groups and their relationships to each other and to the environment. It enables students to gain some proficiency in the scientific study of group structures and processes. A further objective is to help students become more skillful in working with community institutions, agencies, and organizations either through gainful employment or as a volunteer.

For the Associate in Arts, 60 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015(3), SPCOM 100(3)	x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
	x	x
ARTS AND HUMANITIES (3 credits)		
	x	x

SOLAR HEATING AND COOLING TECHNOLOGY

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
SOCIAL SCIENCES (3 credits) (Not to include Sociology)	x	x
GENERAL EDUCATION SELECTION (3 credits) Select 3 credits in any of the areas above to be determined by the department	x	x
REQUIREMENTS FOR THE MAJOR: 39 credits		
PREScribed COURSES (6 credits)		
SOC 001(3)	x	—
SOC 007(3)	—	x
ADDITIONAL COURSES (12 credits) Select 12 credits from SOC 003, 005, 012, 013, 015, 023, 030, 047, or 055	x	x
SUPPORTING COURSES AND RELATED AREAS (12 credits) Select 12 credits in arts, humanities, social and behavioral sciences	x	x
ELECTIVES (9 credits)	x	x

SOLAR HEATING AND COOLING TECHNOLOGY  
(2SOLR)

This major is designed to prepare solar technicians for the expanding solar and related industries. They will be prepared to help design, specify, test, and supervise installation, and make cost estimates for residential and commercial solar energy-assisted heating and cooling systems involving the use of recognized standard components.

Some graduates of this program continue their education by enrolling in the baccalaureate Building Construction Technology or Energy Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 68 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
GENERAL DEGREE REQUIREMENTS: 24 credits		
COMMUNICATIONS (6 credits)		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (9 credits)		
MATH 807(5), 808(4)	x	—
ARTS AND HUMANITIES (3 credits) Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits) Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits) CMPSC 101(3)	x	—

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

*Scheduling Recommendation  
by Semester Standing*

1-2	3-4
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**REQUIREMENTS FOR THE MAJOR: 44 credits**


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**PRESCRIBED COURSES (38 credits)**

A E 801(2), 802(2), E E 800(2), E G 001(2), M E 881(4), PHYS 150(3), S T 801(2)	x	—
A E 803(3), 804(3), PHYS 151(3), S T 804(3), 807(3), 808(3), 809(3)	—	x

**ADDITIONAL COURSES (6 credits)**

Select 6 credits from the following technical

courses: A E 807, 809, 810, 814, 815, 830,

CMPSC 102, CHEM 011, 012, E G 803, 830, E MCH 811,

812, 813, MATH 140, 141, 231, 250, S T 806,

or 830

— x

## SURVEYING TECHNOLOGY (2 SRT)

The objectives of the major are to provide a knowledge of the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys, and to develop trained personnel who understand the relation between the precision of measurements and the interpretation of data in addition to having an appreciation of the skills and equipment needed to make precise measurements in the field of surveying.

Some graduates of this program continue their education by enrolling in the baccalaureate Building Construction Technology or Transportation Technology programs offered at Penn State's Capitol Campus. Graduation from one of these programs further expands the choices of employment.

For the Associate in Engineering, 69-70 credits are required.

*Scheduling Recommendation  
by Semester Standing*

1-2	Summer	3-4
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**GENERAL DEGREE REQUIREMENTS: 24 credits**


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**COMMUNICATIONS (6 credits)**

ENGL 015*(3)	x	—	—
SPCOM 100(3)	—	—	x

**QUANTIFICATION AND NATURAL SCIENCES (9 credits)**

MATH 807(5), 808(4)	x	—	—
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**ARTS AND HUMANITIES (3 credits)**

Select 3 credits in arts or humanities	—	—	x
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**SOCIAL SCIENCES (3 credits)**

Select 3 credits in social sciences	—	—	x
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**GENERAL EDUCATION SELECTION (3 credits)**

CMPSC 101(3)	x	—	—
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**REQUIREMENTS FOR THE MAJOR: 45-46 credits**


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**PRESCRIBED COURSES (43 credits)**

C E 809(2), 811(3), 812(3), 818(2), E G 001(2), ENGL 826(3)	x	—	—
PHYS 150(3), 151(3)	x	—	x

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\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 must take ENGL 015. ENGL 218 or 826 is required for all students in the program.



	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
C E 813(4)	—	x	—
C E 810(3), 814(3), 815(3), 816(3), 817(2), 890(2), E G 012(2)	—	—	x
<b>ADDITIONAL COURSES (2-3 credits)</b>			
Select 2-3 credits from the following technical courses: C E 822, 823, 824, 825, 830, 840, 841, 861, CHEM 011, 012, CMPSC 102, E E 800, E G 003, 803, 830, E MCH 810, 811, I E 315, 805, MATH 140, 141, 231, or M E 800			
	—	—	x

TELECOMMUNICATIONS TECHNOLOGY (2TELT)

The field of telecommunications includes the transmission of voice and digital signals by telephone, telegraph, radio, television, and satellite. Graduates of this major will be engineering technicians who help select, design, install, operate, maintain, troubleshoot, and repair modern telecommunications systems. Future uses for telecommunications systems include electronic mail, electronic shopping, home computer terminal tie-ins, remote utility meter reading, and the transmission of biomedical data between hospitals, libraries, and doctors' offices.

Some graduates of this program continue their education by enrolling in the Electrical Design Engineering Technology program offered at Penn State's Capitol Campus. Graduation from this program further expands the choices of employment.

For the Associate in Engineering, 70 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
<b>COMMUNICATIONS (6 credits)</b>		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (9 credits)</b>		
MATH 807(5), 808(4)	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
Select 3 credits in arts or humanities	—	x
<b>SOCIAL SCIENCES (3 credits)</b>		
Select 3 credits in social sciences	—	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>		
CMPSC 101(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 46 credits</b>		
<b>PRESCRIBED COURSES (46 credits)</b>		
E E 801(4), 805(1), 809(1), 810(3), 814(3), 818(2), E G 001(2), PHYS 150(3), TELCM 840(1)	x	—
E E 804(2), 806(1), 811(3), 816(3), 817(4), 820(1), 821(1), PHYS 151(3), TELCM 841(3), 842(1), 843(3), 844(1)	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

## WILDLIFE TECHNOLOGY (2WLT)

This program will prepare a student in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and the care, maintenance, and propagation of animals. Graduates should be able to support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research.

For the Associate in Science, 66 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>			
<b>COMMUNICATIONS (6 credits)</b>			
ENGL 004 or 015(3)	x	—	—
SPCOM 100(3)	—	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (6 credits)</b>			
MATH 807(3)	x	—	—
Select 3 credits in quantification or natural sciences*	—	—	x
<b>ARTS AND HUMANITIES (3 credits)</b>			
Select 3 credits in arts or humanities	x	—	—
<b>SOCIAL SCIENCES (3 credits)</b>			
Select 3 credits in social sciences	—	—	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>			
ENGL 826(3)	—	—	x
<b>REQUIREMENTS FOR THE MAJOR: 45 credits</b>			
<b>PRESCRIBED COURSES (45 credits)</b>			
C E 809(2), FOR 240(3), 250(3), WILDL 801(3), 802(3), 803(3)	x	—	—
WILDL 805(3), 806(2)	—	x	—
FOR 242(3), HL ED 013(1), WILDL 804(3), 807(3), 808(3), 809(3), 811(4), 813(3)	—	—	x

\*Students may select course work in biology, computer science, or earth sciences in consultation with a faculty adviser.

# COURSE DESCRIPTIONS

## CREDITS AND HOURS

Credits are awarded on the semester-hour basis. According to Senate Policy 42-23, a total of at least forty hours of work planned and arranged by the University faculty is required for the average student to gain 1 credit. While the distribution of time varies from course to course, generally, one-third of the time is devoted to formal instruction, such as lecture, recitation, laboratory, field trips, etc., and two-thirds of the time to outside preparation.

Credits, classroom work, and practicum or laboratory work are indicated by three numbers in parentheses immediately following the course title—for example (3:3:0):

1. The first number shows the maximum credits authorized for the course.
2. The second number shows the periods of classroom work (including lecture, recitation, class discussion, demonstration, or various combinations of these).
3. The third number shows the periods of practicum work (including laboratory, shop work, studio, drafting room, field trips, etc.).

A typical period is fifty minutes.

Courses numbered from 800 to 899 are reserved for the associate degree majors. Credit received for 800-series courses may be applicable to a particular baccalaureate degree program offered by the University at the discretion of the appropriate college and major department. Courses numbered from 1 to 399 carry baccalaureate credit and are required in most of the associate degree majors. Elective credit courses vary from campus to campus and semester to semester, and all of the courses listed below are not offered at each campus. Students may obtain information about the specific course offerings for a given campus from the appropriate *Schedule of Classes*.

## ACCOUNTING (ACCTG)

16. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Accounting for proprietorships, partnerships, and corporations for retailers and manufacturers; financial statement analysis. Students who have passed Acctg. 101 may not schedule this course.

101. INTRODUCTORY FINANCIAL ACCOUNTING (3:2½:1) Fundamentals of the collection, recording, summarization, and interpretation of accounting data.

104. INTRODUCTORY MANAGERIAL ACCOUNTING (3:2½:1) Actual and standard cost systems; managerial uses of cost data. Prerequisite: Acctg. 101.

801. INTRODUCTORY ACCOUNTING (3:2:1)

802. INTRODUCTORY ACCOUNTING (3:2:1) Prerequisite: Acctg. 801.

803. INTERMEDIATE ACCOUNTING (3:3:0) Financial accounting statements, concepts, and procedures; assets, liabilities, owners' equity, statement analysis. Prerequisite: Acctg. 802.

806. FEDERAL TAX ACCOUNTING (3:3:0) Federal tax revenue system as it affects the individual and business; tax planning, research, and preparation of returns. Prerequisite: Acctg. 802.

807. MANAGERIAL ACCOUNTING (3:3:0) Cost and budgetary control; preparation of information for decision making. Prerequisite: Acctg. 802.

810. INTRODUCTION TO FEDERAL TAX PREPARATION (1:1:0) Preparation of tax returns for low-income and elderly individuals in cooperation with the IRS Volunteer Income Tax Assistance Program. Prerequisite: Acctg. 101 or 802.

816. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Fundamentals of accumulation and summarization of accounting data; emphasis on financial statement analysis and the uses of accounting in business.

## ADMINISTRATION OF JUSTICE (ADM J)

111. INTRODUCTION TO THE AMERICAN CRIMINAL JUSTICE SYSTEM (3:3:0) Criminal justice systems, including formulation of laws, extent of crime, processing and correction of offenders, victims.

221. ISSUES IN THE AMERICAN CRIMINAL JUSTICE SYSTEM (3:3:0) Examination of the models of the criminal process, functions of the justice system, and approaches to crime and punishment. Prerequisite: Adm.J. 111.
240. FIELD RESEARCH IN THE ADMINISTRATION OF JUSTICE (1:1:0) Field research strategies appropriate to the investigation of research questions in the administration of justice. Prerequisite: Adm.J. 111.
241. APPLICATION OF FIELD RESEARCH IN ADMINISTRATION OF JUSTICE (2:0:4) The use of observational research strategies in identifying and analyzing issues in the administration of justice. Prerequisite: Adm.J. 240.
394. INTRODUCTION TO FIELD WORK IN ADMINISTRATION OF JUSTICE (1:1:0) Planning and preparation for field experience in an administration of justice agency setting. Prerequisites: Adm.J. 221, 240.
395. FIELD WORK IN ADMINISTRATION OF JUSTICE (13:0:26) Field experience focusing on the student's major interest within the administration of justice. Prerequisite: Adm.J. 394.
396. POST FIELD WORK SEMINAR IN ADMINISTRATION OF JUSTICE (1:1:0) Examination of concepts, critical issues, processes, and procedures which are useful in explaining and understanding the field internship experience. Prerequisite: Adm.J. 395.

## AGRICULTURAL ECONOMICS (AG EC)

101. INTRODUCTION TO AGRICULTURAL ECONOMICS (3:3:0) Application of economic principles to resource allocation problems in the production, marketing, and consumption of food and agricultural products. Not open to students in the Agricultural Economics and Rural Sociology or Agricultural Business Management major.
102. INTRODUCTION TO FOOD AND AGRICULTURAL MARKETING (3:3:0) Comprehensive theoretical and descriptive survey of farm and food products marketing from the perspective of producers, marketing middlemen, and consumers.
106. INTRODUCTION TO FARM MANAGEMENT (3:3:0) Organizing and operating farm businesses for financial success; measuring profits; improving efficiency of labor, land, capital; getting started in farming.

## AMERICAN STUDIES (AM ST)

100. INTRODUCTION TO AMERICAN STUDIES (3:3:0) A study of selected attempts to identify and interpret movements and patterns in American culture. Prerequisite: third-semester standing.
105. AMERICAN POPULAR CULTURE AND FOLKLIFE (3:3:0) Survey of popular culture, folklife, and ethnicity, synthesizing material from such areas as literature, media, entertainment, print, music, and film.

## ANTHROPOLOGY (ANTHY)

1. INTRODUCTORY ANTHROPOLOGY (3:3:0) Prehistoric and primitive people and cultures; primitive customs and institutions compared with those of modern man.
45. CULTURAL ANTHROPOLOGY (3:3:0) Beginnings of human culture; primitive economic life, society, government, religion, and art; cultural background of personality development.

## ARCHITECTURAL ENGINEERING TECHNOLOGY (A E)

801. BUILDING MATERIALS (2:2:0) Structural and architectural use of building materials and construction assemblies.
802. METHODS OF CONSTRUCTION (2:0:4) Materials and methods of construction used in buildings, as expressed in drawings. Prerequisite or concurrent: A.E. 801, E.G. 1.



## ART

803. PLUMBING AND FIRE PROTECTION (3:2:2) Layout of plumbing and fire protection in buildings to meet code and usage requirements. Prerequisite or concurrent: A.E. 802.
804. HEATING, VENTILATING, AND AIR CONDITIONING LAYOUT (3:2:2) Fundamental calculations and layout of systems in buildings. Prerequisite or concurrent: A.E. 802.
806. ARCHITECTURAL PRESENTATION (2:1:2) Visual communication through architectural presentation drawings. Line, value, color, and composition. Prerequisite: E.G. 1 or 3.
807. ADVANCED CONSTRUCTION METHODS (3:1:5) Integration of materials and systems in working drawings. Prerequisite: fourth-semester standing.
809. STRUCTURE DESIGN (3:2:3) Elementary principles of structural design and detailing in timber, steel, and reinforced concrete; use of handbooks; fundamentals of structural and architectural drafting. Prerequisites: E.Mch. 813; A.E. 802 or E.G. 803.
810. ARCHITECTURAL ENGINEERING OFFICE PRACTICE (3:3:0) Procedures involved in production of contract documents, both drawings and specifications. Prerequisite: fourth-semester standing.
812. BUILDING LIGHTING AND ELECTRICAL LAYOUT (3:2:2) Layout of lighting and electrical distribution in buildings.
813. SITE PLANNING (2:1:2) Energy conservation through optimum site utilization, contours, cut and fill calculations, storm drainage, spot grading, and finish grading. Prerequisite: A.E. 802.
814. STEEL CONSTRUCTION (3:2:2) Strength of materials as applied to the design of simple steel structures. Prerequisites: A.E. 802, E.Mch. 811.
815. CONCRETE CONSTRUCTION (3:2:2) Fundamentals of design and construction of reinforced concrete structures. Prerequisites: A.E. 802, E.Mch. 811.
830. SELECTED TOPICS IN ARCHITECTURAL ENGINEERING TECHNOLOGY (3) Individual or group work in architectural engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## ART (ART)

110. DESIGN: TWO DIMENSIONAL (3:2:4) Introduction to design in two dimensions. Pictorial space and the principles of visual organization of the flat surface.
111. DESIGN: THREE-DIMENSIONAL (3:2:4) Introduction to design in three dimensions. Principles of visual organization in working with actual space and volume.
120. INTRODUCTION TO DRAWING (3:2:4) The study and practice of basic drawing as a way of understanding and communicating.
121. DRAWING: TECHNIQUES, MATERIALS, AND TOOLS (3:2:4) Drawing with an emphasis on organization and the development of drawing skills through a variety of techniques, materials, and tools. Prerequisite: Art 120.
180. CERAMIC ARTS (3:2:4) Introduction to potter's wheel techniques; experiments with decorative application; includes the technical concerns for clay, glazes, and kilns. For non-Art majors.
280. INTRODUCTORY CERAMIC ARTS (3:2:4) The fundamentals of ceramics, throwing, hand-building, and glazing; acquainting the student with ceramic materials, techniques, and philosophy. Prerequisite: 2 credits in studio art.
296. INDEPENDENT STUDIES (1-18)

## ART EDUCATION (A ED)

14. INTRODUCTORY CRAFTS FOR TEACHERS (3:1:5) Direct experience with materials such as wood, clay, metal, paper, textiles, and plastics in relationship to the creative needs of children.

## ART HISTORY (ART H)

100. INTRODUCTION TO ART (3:3:0) An approach to the understanding of art through a critical analysis of selected works of architecture, painting, and sculpture. Students who have passed Art H. 110 may not schedule this course.

110. SURVEY OF WESTERN ART (3:3:0) General survey of major developments in architecture, painting, and sculpture in the Western world. Students who have passed Art H. 100 may not schedule this course.

111. SURVEY OF WESTERN ART I (3:3:0) Survey of the major monuments and trends in the history of art from prehistory through the late Gothic period. Students who have passed Art H. 110 may not schedule this course.

112. SURVEY OF WESTERN ART II (3:3:0) Survey of the major monuments and trends in the history of art from the Renaissance to the modern era. Students who have passed Art H. 110 may not schedule this course.

214. MODERN ARCHITECTURE (3:3:0) Architecture and related arts of sculpture and painting from the end of the eighteenth century to the present day. Nontechnical in nature.

305. EUROPEAN ART FROM 1780-1860 (3:3:0) A survey of painting and sculpture in Europe from the beginnings of Neoclassicism through the Realist movement. Prerequisite: Art H. 100 or 110 or 112.

307. AMERICAN ART (3:3:0) History of art in the English colonies and the United States from the seventeenth century to the present.

## THE ARTS (ARTS)

1. THE ARTS (3:3:0) Developing perception in the arts through relating the visual, musical, performing, and environmental arts.

## ASTRONOMY (ASTRO)

1. ASTRONOMICAL UNIVERSE (3:3:0) Nonmathematical description of the astronomical universe and the development of scientific thought. For nonscience majors. Students who have passed Astro. 90 may not schedule this course.

10. MAN AND UNIVERSE (2:2:0) Nonmathematical description of stars, planets, galaxies, and the universe. For nonscience majors. Students who have passed Astro. 1 or 90 may not schedule this course.

11. ELEMENTARY ASTRONOMY LABORATORY (1:0:2) Selected experiments and data analysis to illustrate major astronomical principles and techniques. Telescopic observations of stars and galaxies. For nonscience majors. Prerequisite or concurrent: Astro. 1 or 10.

## BIOCHEMISTRY (BIOCH)

1. BIOCHEMICAL SCIENCE (3:3:0) Biochemistry of important functions of man and animals, including genetics, nutrition, metabolic and disease processes, and environmental relationships.

## BIOLOGICAL SCIENCE (BI SC)

1. STRUCTURE AND FUNCTION OF ORGANISMS (3:3:0) Origin, development, and cellular basis of life; fundamental principles, processes, and structures of organisms. Students who have passed Biol. 27, 41, 101, or 102 may not schedule this course.

2. GENETICS, ECOLOGY, AND EVOLUTION (3:3:0) How living organisms pass on their inheritance, how plants and animals came to be what they are, and how they now react. Students who have passed Biol. 33, 101, 102, or 222 may not schedule this course.

## BIOLOGY

3. **MAN AND HIS ENVIRONMENT (3:3:0)** Kinds of environments; past and present uses and abuses of natural resources; disposal of man's wastes; prospects for the future. Students who have passed Biol. 210 or any other upper-level ecology course in biology may not schedule this course.
4. **BIOLOGY OF MAN (3:3:0)** A general survey of structure and function in man – from conception, through growth and reproduction, to death. Students who have passed Biol. 29 and 41 may not schedule this course.

## BIOLOGY (BIOL)

29. **MAMMALIAN ANATOMY (4:2:4)** Anatomy of a mammal, with special reference to that of man. Students who have passed Biol. 421 may not schedule this course.
33. **HUMAN GENETICS (3:3:0)** Human heredity and its individual and social implications. Students who have passed Biol. 222 may not schedule this course. Prerequisite: 3 credits in Biological Science.
41. **PHYSIOLOGY (3:3:0)** Normal functions of the animal body, with special reference to those of man. Students who have passed Biol. 472 may not schedule this course.
42. **PHYSIOLOGY LABORATORY (1:0:2)** Experiments demonstrating basic physiological principles, with special reference to man. Prerequisite or concurrent: Biol. 41.
101. **PRINCIPLES OF BIOLOGY I (4:3:2)** Introduction to cell biology; biology of vertebrates; overview of monerans, protists, and animals.
102. **PRINCIPLES OF BIOLOGY II (4:3:2)** Continuation of Biol. 101, with emphasis on plants and fungi; genetics of organisms and populations; evolution. Prerequisite: Biol. 101.

## BIOMEDICAL EQUIPMENT TECHNOLOGY (B E T)

801. **PHYSIOLOGICAL TRANSDUCERS (5:4:2)** Study of the principles of operation and applications of devices used for the conversion of physiological events to electrical signals. Prerequisite: E.E. 810.
802. **BIOMEDICAL INSTRUMENTATION AND SYSTEMS (5:4:2)** Introduction to the operating principles, calibration, and maintenance of biomedical instruments and systems with special emphasis given to patient safety. Prerequisite: B.E.T. 801.
803. **BIOMEDICAL EQUIPMENT LABORATORY (Internship) (4:1:6)** Practical experience, within or related to the hospital environment, on a variety of biomedical instruments. Prerequisites: B.E.T. 804, Biol. 41.
804. **MEDICAL AND CLINICAL EQUIPMENT (3:2:2)** Principles of operation of clinical, medical radiography, intensive care, anesthesia, respiratory, non-invasive imaging, and emergency equipment; hospital electrical safety. Prerequisite: B.E.T. 801.
830. **SELECTED TOPICS IN BIOMEDICAL EQUIPMENT TECHNOLOGY (3)** Individual or group work in biomedical equipment technology for students with specific occupational objectives. Prerequisite: third-semester standing.

## BUSINESS ADMINISTRATION (B A)

250. **PROBLEMS OF SMALL BUSINESS (3:3:0)** Analysis of problems of the small firm, particularly for the student who wishes to venture into business. Prerequisite: 3 credits in economics.
803. **COOPERATIVE PRACTICUM WITH BUSINESS OFFICES (6:0:12)** Cooperative practical work with business offices under the supervision of the instructor.

## BUSINESS LAW (B LAW)

243. **LEGAL ENVIRONMENT OF BUSINESS (3:3:0)** Social control through law: courts, basic policies underlying individual and contractual rights in everyday society. Prerequisite: third-semester standing.
850. **REAL ESTATE LAW (3:3:0)** Basic legal principles involved in the negotiation of real estate transactions.



## BUSINESS LOGISTICS (B LOG)

301. BUSINESS LOGISTICS MANAGEMENT (3:3:0) Management of logistics function in firm, including physical supply and distribution activities such as transportation, storage facility location, and materials handling. Prerequisite: third-semester standing.
304. TRANSPORT SYSTEMS (3:3:0) Conceptual model of a transport system; environmental relationships; modal components and managerial conditions, with special application to the United States. Prerequisite: B.Log. 301.
305. TRAFFIC MANAGEMENT (3:3:0) Analysis of the traffic function in the logistics system. Evaluation of routes, rates, and shipping document procedures. Prerequisite: B.Log. 301 or 304.

## CHEMICAL ENGINEERING TECHNOLOGY (CH E)

810. CHEMICAL TECHNOLOGY (4:4:0) Industrial stoichiometry, material balances, heats of reaction. Prerequisite or concurrent: Chem. 13, 15.
811. CHEMICAL TECHNOLOGY (5:5:0) Fluid flow, heat transfer, evaporation, distillation, air-water interaction. Prerequisite: Ch.E. 810.
821. CHEMICAL TECHNOLOGY LABORATORY (2:1:2) Measurements in stoichiometry, material balances, and heats of reaction; industrial laboratory report writing. Prerequisite or concurrent: Ch.E. 810.
822. CHEMICAL TECHNOLOGY LABORATORY (2:1:2) Measurements in fluid flow, heat transfer, distillation, mass transfer; chemical analytical techniques. Prerequisite or concurrent: Ch.E. 811.
830. INDUSTRIAL CHEMISTRY (3:3:0) The commercial preparation of important chemicals and derivatives with emphasis upon the chemistry involved and the flow of material. Prerequisite or concurrent: Chem. 13, 15.
831. SELECTED TOPICS IN CHEMICAL ENGINEERING TECHNOLOGY (3) Individual or group work in chemical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## CHEMISTRY (CHEM)

11. INTRODUCTORY CHEMISTRY (3:2:2) Selected principles and applications of chemistry. Prior study of chemistry not assumed.
12. CHEMICAL PRINCIPLES (3-4) Basic concepts and quantitative relations. Prerequisite: Satisfactory performance on placement examination—students take Chem. 12 for 3 credits. Unsatisfactory performance on placement examination—students take Chem. 12 for 4 credits.
13. CHEMICAL PRINCIPLES (3:3:0) Continuation of Chem. 12, including introduction to the chemistry of the elements. Prerequisite: Chem. 12. Prerequisite or concurrent: Chem. 14.
14. EXPERIMENTAL CHEMISTRY (1:0:3) Introduction to quantitative experimentation in chemistry. Prerequisite or concurrent: Chem. 12.
15. EXPERIMENTAL CHEMISTRY (1:0:3) Continuation of Chem. 14, with emphasis on analytical procedures. Prerequisite: Chem. 14. Prerequisite or concurrent: Chem. 13.
17. INTRODUCTORY AND GENERAL CHEMISTRY (5:5:2) Introductory and general chemistry for students who are required to take additional chemistry, e.g. Chem. 13, but are unprepared for Chem. 12. Students may not receive credit for both Chem. 17 and Chem. 11 or 12.
23. INTRODUCTION TO MODERN ANALYTICAL CHEMISTRY (4:2:4) Contemporary methods of chemical and instrumental analysis, including potentiometric titration, specific ion electrodes, spectrophotometry, and chromatography. Prerequisite: Chem. 15.
34. ORGANIC CHEMISTRY (3:3:0) Introduction to organic chemistry, with emphasis on the properties of organic compounds of biochemical importance. Not open to those who have previously scheduled Chem. 37. Prerequisite: Chem. 11 or 12 or 17.
35. ORGANIC CHEMISTRY (3:2:4) Introduction to organic chemistry, with emphasis on the identification of organic compounds by characteristic chemical reactions and by spectroscopy. Prerequisite: Chem. 34.



36. **LABORATORY IN ORGANIC CHEMISTRY (2:0:6)** Basic laboratory operations; applications of theories and principles. Prerequisite: Chem. 38. Prerequisite or concurrent: Chem. 39 or 40.
37. **ORGANIC CHEMISTRY (3:3:0)** Introduction to organic chemistry, with emphasis on topics of particular relevance to mineral science, materials science, and engineering. Not open to those who have previously scheduled Chem. 34. Prerequisite: Chem. 11 or 12.
38. **ORGANIC CHEMISTRY (4:4:0)** Principles and theories; nomenclature; chemistry of the functional groups; applications of spectroscopy. Students may not receive credit for both Chem. 38 and 34. Prerequisite: Chem. 13.
39. **ORGANIC CHEMISTRY (3:3:0)** Continuation of Chem. 38 to include especially polyfunctional organic molecules and the organic chemistry of biologically important molecules. Students may not receive credit for both Chem. 39 and 40. Prerequisite: Chem. 38.
40. **ORGANIC CHEMISTRY (2:2:0)** Continuation of Chem. 38 to include especially polyfunctional organic molecules. Students may not receive credit for both Chem. 39 and 40. Prerequisite: Chem. 38.
102. **ENVIRONMENTAL CHEMISTRY (3:3:0)** Applications of chemistry to environmental problems, including air, water, thermal pollution; pesticides; drugs and birth control agents; food additives; etc. For non-Chemistry majors; Chemistry majors will not receive credit.
389. **SPECIAL PROBLEMS AND RESEARCH (1-4)** Designed for freshman or sophomore students who are prepared to undertake special problems and research by arrangement with a faculty member.
395. **CHEMISTRY TEACHER ASSISTANT TRAINING (1-2)** Instruction and practice in the role of the teaching assistant in the undergraduate chemistry laboratory.

## CIVIL ENGINEERING TECHNOLOGY (C E)

809. **TOPOGRAPHIC DRAWING (2:0:4)** Conventional mapping symbols; constructing topographic maps from stadia notes; estimating grading quantities from topographic maps. Prerequisite: E.G. 1 or 10. Prerequisite or concurrent: C.E. 811 or Wildl. 802.
810. **STATISTICS AND LEAST SQUARES (3:3:0)** Frequency distribution; histograms; frequency polygons; measures of central tendency; dispersion; uses of normal curve; least squares applied to surveying problems. Prerequisite: Math. 808.
811. **PLANE SURVEYING (3:2:3)** Theory of plane surveying; use, care, and adjustments of surveying equipment; traversing, areas, leveling, stadia, and plane table mapping. Prerequisite: Math. 807.
812. **CURVES AND EARTHWORK (3:2:3)** Computation and laying out of horizontal and vertical curves; calculation of cut and fill; setting slope stakes for construction. Prerequisite or concurrent: C.E. 811, Math. 807.
813. **PRACTICAL FIELD PROBLEMS (4:1:9)** Geodetics, topography, field astronomy; route location; hydrographic surveys; land subdivision; use of electronic measuring devices. Prerequisites: C.E. 812, 818.
814. **PHOTOGRAMMETRY (3:1:4)** Interpretation and use of aerial photographs; mapping by photogrammetric methods; application of aerial and terrestrial photographic surveying to specific engineering problems. Prerequisite: C.E. 818.
815. **GEODETIC SURVEYING (3:1:4)** Precision vertical and horizontal control surveys; level nets; reciprocal leveling; triangulation; state plane coordinates; astronomic observations for azimuth and latitude. Prerequisites: C.E. 811, Math. 807.
816. **SPECIAL SURVEYS (3:1:4)** Applications of surveying in hydrography, mining, construction, and subdivision planning; surveying registration law and professional ethics. Prerequisites: C.E. 812, 813.
817. **CARTOGRAPHIC TECHNIQUES (2:0:4)** Use of tools and equipment; projections used in art, advertising, government maps; relief methods; scribing techniques; map reproduction methods. Prerequisite: C.E. 809.

818. **ROUTE SURVEYING (2:0:4)** Field and office operations connected with highway and rail-road location; mass diagram as related to economical distribution of earthwork. Prerequisite: C.E. 811. Concurrent: C.E. 812.
821. **CONCRETE TECHNOLOGY (3:2:2)** Characteristics of portland cement concrete, physical properties of constituent materials, testing procedures, basics of reinforced concrete. Prerequisite or concurrent: E.Mch. 813.
822. **SOIL MECHANICS (3:2:2)** Identification, classification, sampling, testing, handling, and consolidation of soils for highway construction. Prerequisites: E.Mch. 811, Phys. 151.
823. **HIGHWAY ORGANIZATION AND OPERATIONS (3:2:2)** Fundamentals of technology; plans and specifications; drainage, cost, traffic studies, and highway safety. Prerequisite: second-year standing in Highway Engineering Technology.
824. **ASPHALT TECHNOLOGY (3:2:2)** The use and testing of asphaltic material as adapted to highways.
825. **CONSTRUCTION ESTIMATING (3:2:2)** Job organization, estimating, cost control, construction methods and equipment for highway construction projects.
830. **SELECTED TOPICS IN CIVIL ENGINEERING TECHNOLOGY (3)** Individual or group work in civil engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.
840. **HYDROLOGY AND DRAINAGE (3:2:2)** Introduction to railway hydrology and drainage, soil studies, erosion control, and hydraulic design of culverts. Prerequisites: C.E. 809, 811.
841. **ECONOMIC RAILWAY LOCATION AND GEOMETRIC DESIGN (3:2:2)** Railway economics, history, design, and maintenance of vertical and horizontal curves; speed and superelevation. Prerequisites: C.E. 812, 818.
842. **RAILWAY TRACK MAINTENANCE AND OPERATION (3:2:2)** Specifications for safety standards for track, programming maintenance operations, track inspection. Prerequisite: C.E. 841. Concurrent: C.E. 843.
843. **RAILWAY TRACK STRUCTURE DESIGN AND CONSTRUCTION (3:2:2)** Design, layout, and construction of yards, turnouts, interlocking plants, and structures. Prerequisite or concurrent: E.Mch. 813. Concurrent: C.E. 842.
861. **FLUID FLOW (3:3:0)** Elementary theory of fluid flow: hydrostatics; flow through orifices, Venturi meters, and pipes; flow in open channels; theory of the centrifugal pump. Prerequisites: E.Mch. 811, Math. 807.
890. **LEGAL ASPECTS OF SURVEYING (2:2:0)** Legal principles affecting the determination of property boundaries; responsibilities of surveyors, attorneys, title companies, and the court. Prerequisite: C.E. 811.

## COMPUTER SCIENCE (CMPSC)

1. **BASIC COMPUTER PROGRAMMING (1:0:2)** Fundamental characteristics of digital computers; organization and coding of problems for solution on digital computer. Prerequisite: 2 entrance units in mathematics.
100. **COMPUTER FUNDAMENTALS AND APPLICATIONS (3:3:0)** Introduction to computer fundamentals and applications to data processing environments. Prerequisite: 2 entrance units in mathematics.
101. **INTRODUCTION TO ALGORITHMIC PROCESSES (3:3:0)** Properties of algorithms, languages, and notations for describing algorithms; applications of a procedure-oriented language to problem solving. Students who have passed Cmp.Sc. 201 or 203 may not schedule this course. Prerequisite: 2 entrance units in mathematics.

## CURRICULUM AND INSTRUCTION

102. **COMPUTER ORGANIZATION AND PROGRAMMING (3:3:0)** Computer components and organization, representation of numbers and characters, instruction codes, machine language, programming, assembly systems, input-output, subroutines, and macros. Prerequisite: Cmp.Sc. 101.
120. **INTERMEDIATE PROGRAMMING (4:3:3)** Systematic programming: top-down program development, documentation, and testing. Verification of program correctness. Introduction to data structures, numerical methods. Prerequisites: Cmp.Sc. 101 or 201; Math. 140.
140. **INTRODUCTION TO DATA PROCESSING (3:3:0)** Applications of digital computers to problems in data processing with examples from accounting, record updating, inventory control, and report generation. Prerequisite: Cmp.Sc. 101.
144. **DATA ORGANIZATION AND ACCESSING TECHNIQUES (4:3:2)** Design characteristics of external storage devices; record organizations; accessing considerations for sequential, direct, relative, and indexed files; internal data structures. Prerequisites: Cmp.Sc. 102, 140.
154. **ADVANCED ASSEMBLER, I/O TECHNIQUES, AND JOB CONTROL LANGUAGES (3:3:1)** Macro-expansion; assembler-level I/O control; COBOL-assembler linkage conventions; advanced debugging techniques; assembler design; op-system features and JCL techniques. Students may not take both Cmp.Sc. 154 and 442 for credit. Prerequisite: Cmp.Sc. 144.
164. **CONTEMPORARY TRENDS IN COMPUTER PROGRAMMING (3:3:0)** State of the technology in design, code, test, and documentation techniques for information processing systems and large EDP production programs. Students may not take both Cmp.Sc. 164 and 444 for credit. Prerequisite: Cmp.Sc. 154.
201. **COMPUTER PROGRAMMING FOR ENGINEERS (3:3:0)** Development and implementation of algorithms in a procedure-oriented language, with emphasis on numerical methods for engineering problems. Students who have passed Cmp.Sc. 101 or 203 may not schedule this course.
203. **PRINCIPLES OF PROGRAMMING WITH BUSINESS APPLICATIONS (3:2:2)** Computer program structures; data processing procedures; structure of data files; programming in a high-level language. Designed for business students. Students who have passed Cmp.Sc. 101 or 201 may not schedule this course. Prerequisites: Acctg. 101, Q.B.A. 102; or Acctg. 101, Q.B.A. 101, Stat. 200.
211. **INTRODUCTION TO SYSTEMS PROGRAMMING (3:2:2)** Review of computer architecture concepts; assembly language programming, I/O routines, linkage and loading; microprocessor and large computer assembly languages. Prerequisite: Cmp.Sc. 120. Concurrent: E.E. 271.
803. **COMPUTER APPLICATIONS IN BUSINESS (3:3:0)** Characteristics of digital computers; the role of data processing in business; programming in a high-level language. Designed for two-year Business Administration students. Students who have passed Cmp.Sc. 101, 201, or 203 may not schedule this course.
804. **COMPUTER FUNDAMENTALS AND APPLICATIONS (2:2:0)** Types of computers and computer systems; storage and I/O devices; number systems and data representation; computer applications; typical EDP organization.
805. **COMPUTER APPLICATION PROBLEM (1-3)** The organization, flow charting, programming, debugging, and documentation of a major applied problem in a field of computer application. Prerequisite: fourth-semester standing.
890. **SPECIAL TOPICS IN COMPUTER PROGRAMMING (1-3)** Application of any of several specific computer programming languages to problem solving. Prerequisite: Cmp.Sc. 101.

## CURRICULUM AND INSTRUCTION (C I)

295. **INTRODUCTORY FIELD EXPERIENCE FOR TEACHER PREPARATION (2-3 per semester, maximum of 6)** Selected observation of schooling situations with small group and tutorial participation. Prerequisite: second-semester standing. Concurrent: Ed.Th.P. 115 and/or Ed.Psy. 14.



## DIETETIC FOOD SYSTEMS MANAGEMENT (D S M)

100. THE PROFESSION OF DIETETICS (1:1:0) Introduction to the profession and exploration of the roles and responsibilities of dietetic professionals.
103. INTRODUCTION TO HEALTH FACILITIES FOOD SERVICE ADMINISTRATION (3:3:0) Professional functions of the hospital food service system, relationships with the nutrition component of food service system, and organization served.
205. HUMAN RELATIONS AND DIETETIC SUPERVISORY SKILLS (3:3:0) Theories and principles of supervision and training of food service employees for overall operational effectiveness.
250. QUANTITY FOOD PRODUCTION MANAGEMENT (4:3:1) Systems approach to managing quantity food production functions in health care settings; included are quantity food production principles and standards.
260. MANAGEMENT OF FOOD SERVICE OPERATING SYSTEMS (4:3:1) Major principles related to managing the purchasing, food, and labor subsystems of a health care food service system. Prerequisite: D.S.M. 250.
295. PROFESSIONAL STAFF FIELD EXPERIENCE (4:3:1) Methods of, and practice in, the client-oriented dietetic systems in health care facilities. Prerequisites: D.S.M. 260, 304.
304. MARKETING OF FOOD SERVICES IN HEALTH CARE FACILITIES (3:3:0) Theories and applications of marketing principles to the design of consumer-oriented dietetic services.

## EARTH SCIENCE (EARTH)

1. EARTH SCIENCE (3:3:0) Integrated approach to fundamental problems in the earth sciences. Fields of study include geological sciences, physical geography, and meteorology. No credit will be given for this course if a student takes Geosc. 20, Geog. 19, or Meteo. 2.

## ECONOMICS (ECON)

2. INTRODUCTORY MICROECONOMIC ANALYSIS AND POLICY (3:3:0) Methods of economic analysis and their use; economic aggregates; price determination; theory of the firm; distribution.
4. INTRODUCTORY MACROECONOMIC ANALYSIS AND POLICY (3:3:0) National income measurement; aggregate economic models; money and income; policy problems.
14. PRINCIPLES OF ECONOMICS (3:3:0) Analysis of the American economy, emphasizing the nature and interrelationships of such groups as consumers, business, governments, labor, and financial institutions. Students who have passed Econ. 2 or 4 or are registered in the College of Business Administration may not schedule this course.
302. INTERMEDIATE MICROECONOMIC ANALYSIS (3:3:0) Allocation of resources and distribution of income within various market structures, with emphasis on analytical tools. Prerequisite: Econ. 2.
315. LABOR ECONOMICS (3:3:0) Economic analysis of employment, earnings, and the labor market; labor relations; related government policies. Prerequisite: Econ. 2.

## EDUCATIONAL PSYCHOLOGY (EDPSY)

14. LEARNING AND INSTRUCTION (3:3:0) Psychology of human learning applied toward the achievement of educational goals; evaluation of learning outcomes.
297. SPECIAL TOPICS (1-9)

## EDUCATIONAL THEORY AND POLICY (EDTHP)

115. EDUCATION IN AMERICAN SOCIETY (3:3:0) Introduction to the development of educational institutions, with emphasis on historical, philosophical, and sociological forces.



**ELECTRICAL ENGINEERING TECHNOLOGY (E E)**

800. **APPLIED ELECTRICITY (2:1:2)** Fundamentals of electric circuits; basic principles of electrical machinery and devices; electrical-mechanical analogies; beginning electronics. Prerequisite: Math. 807.
801. **FUNDAMENTALS OF ELECTRICAL CIRCUITS (4:4:0)** Fundamental theory of resistance, current, voltage. Direct-current concepts from simplest series circuits through Thevenin's theorem; single-phase circuit fundamentals. Prerequisite or concurrent: Math. 807.
804. **A.C. CIRCUITS (2:2:0)** Application of network theorems, laws, and methods to alternating-current circuits; balanced and unbalanced polyphase systems. Prerequisite: E.E. 814.
805. **SEMICONDUCTOR LABORATORY (1:0:2)** Laboratory study of semiconductors. Assembly and tracing of electronic circuits. Concurrent: E.E. 810.
806. **A.C. CIRCUITRY LABORATORY (1:0:2)** Laboratory study of alternating-current circuits; assembly and tracing of electrical circuits. Concurrent: E.E. 804.
809. **ELECTRICAL CIRCUITS LABORATORY (1:0:2)** Introduction to electrical apparatus, including instruments, their interconnection into basic circuits, observation of circuit behavior, and report writing. Concurrent: E.E. 801.
810. **FUNDAMENTALS OF SEMICONDUCTORS (3:3:0)** Semiconductor physics and circuit theory including hybrid parameters; equivalent circuits; power amplifiers and frequency response of small signal amplifiers. Prerequisite or concurrent: E.E. 814, Math. 808.
811. **MICROPROCESSORS (3:2:2)** Fundamentals of microprocessors, their application, and interfacing for data processing and control. Prerequisite: E.E. 814.
813. **FUNDAMENTALS OF ELECTRICAL MACHINES (3:2:2)** Direct-current machinery principles and applications; introduction to machines and basic concepts of laboratory methods related to machinery studies. Prerequisites: E.E. 814, 818.
814. **ELECTRICAL CIRCUITS (3:3:0)** Direct-current circuit analysis; introduction to basic magnetism and magnetic circuits; single-phase circuit fundamentals. Prerequisites: E.E. 801, Math. 807.
815. **A.C. MACHINERY AND CONTROL (3:3:0)** Alternating-current machinery principles and applications; survey of alternating- and direct-current machinery control methods. Prerequisites: E.E. 804, 813.
816. **LINEAR ELECTRONIC CIRCUITS (3:3:0)** Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, and operational amplifiers. Prerequisite: E.E. 810.
817. **DIGITAL ELECTRONICS (4:4:0)** Fundamentals of digital circuits, including logic circuits, boolean algebra, counters, A/D and D/A converters, and introduction to computer operation. Prerequisite: E.E. 810.
818. **ELECTRICAL CIRCUITS LABORATORY (2:0:4)** Laboratory study of direct-current networks and alternating-current circuits. Prerequisite: E.E. 809. Concurrent: E.E. 814.
819. **A.C. MACHINERY LABORATORY (1:0:2)** Alternators, induction generators, single- and polyphase motors, synchro units; transformers, saturable reactors, and protective devices. Prerequisite: E.E. 806. Concurrent: E.E. 815.
820. **DIGITAL ELECTRONICS LABORATORY (1:0:2)** Laboratory study of solid state pulse, digital, industrial, and motor control circuits. Prerequisite: E.E. 805. Concurrent: E.E. 817.
821. **LINEAR ELECTRONICS LABORATORY (1:0:2)** Laboratory study of transistors; study of differential and operational amplifiers. Emphasis is placed on circuit design. Prerequisite: E.E. 805. Concurrent: E.E. 816.
830. **SELECTED TOPICS IN ELECTRICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in electrical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## ENGINEERING (ENGR)

2. **ENGINEERING ORIENTATION (1:0:2)** Introduction to efficient methods for analyzing and solving engineering problems.
5. **EXPERIMENTAL METHODS FOR ENGINEERS (1:0:2)** Introduction to experimental methods used in engineering. Applications of basic experimental and computational concepts through student involvement in laboratory experiments.

## ENGINEERING GRAPHICS (E G)

1. **ENGINEERING DRAWING (2:1:3)** Technical skills and drafting room practices; fundamentals of theoretical graphics; orthogonal, oblique, and perspective projections; working and schematic drawings.
3. **ARCHITECTURAL GRAPHICS (2:0:6)** Principles of architectural drawing; spatial relationships of points, lines, planes, and solids, with architectural applications; shadows, perspective.
10. **INTRODUCTORY ENGINEERING GRAPHICS (1:0:3)** Multiview projections, pictorial drawings, dimensioning, engineering standards, and working drawings.
11. **ENGINEERING DESIGN GRAPHICS (1:0:3)** Introduction to creative design, space analysis, graphs, graphical mathematics, vector analysis, and design implementation. Prerequisite: E.G. 10 or 21.
12. **SPATIAL ANALYSIS (2:1:3)** Spatial relations of points, lines, and solids, with engineering applications. Prerequisite: 1 credit of introductory graphics.
50. **ENGINEERING METHODS AND GRAPHICAL COMMUNICATION (3:1:5)** Introduction to engineering through experimental methods of measurement and graphical expressions: multiviews, pictorials, dimensioning, space analysis, graphical mathematics, laboratory experience.
803. **ADVANCED ENGINEERING DRAWING (3:1:4)** Application of principles of engineering drawing, including auxiliary views in the layout of detail, assembly, and working drawings. Prerequisite: E.G. 1.
830. **SELECTED TOPICS IN ENGINEERING GRAPHICS (1-3)** Individual or group work in engineering graphics offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## ENGINEERING MECHANICS (E MCH)

810. **BASIC MECHANICS (2:2:0)** Forces; moments; resultants; equilibrium of force systems; introduction to dynamics. Prerequisite: Math. 807.
811. **ELEMENTARY MECHANICS (3:3:0)** Forces; moments; resultants; equilibrium of force systems; friction; centroids and moment of inertia of areas; dynamics of particles. Prerequisite: Math. 807.
812. **INTRODUCTION TO DYNAMICS (3:2:2)** Absolute and relative motion related to particles and simple linkages. Force-mass-acceleration, work-energy, and impulse-momentum solution techniques. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Math. 808.
813. **STRENGTH AND PROPERTIES OF MATERIALS (3:3:0)** Axial stress and strain; shear; riveted and welded connections; torsion; beam stresses and deflections; combined axial and bending stresses; columns, ductility, resilience, and toughness. Prerequisite: E.Mch. 811.
814. **STRENGTH OF MATERIALS LABORATORY (1:0:2)** Measurement of mechanical properties of materials; structural testing. Concurrent: E.Mch. 813.

## ENGLISH (ENGL)

4. **BASIC WRITING SKILLS (3:3:0 per semester, maximum of 6)** Intensive practice in writing sentences and paragraphs and instruction in grammar, usage, and punctuation. Designed for students with deficient preparation. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*

5. **WRITING TUTORIAL (1:0:2)** Tutorial instruction in composition and rhetoric for students currently enrolled in Engl. 4 or 15. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*
15. **RHETORIC AND COMPOSITION (3:3:0)** Instruction and practice in writing expository prose that shows sensitivity to audience and purpose. Prerequisite: Engl. 4 or satisfactory performance on the English proficiency examination.
30. **HONORS FRESHMAN COMPOSITION (3:3:0)** Writing practice for specially qualified and screened students. Students who have passed a special writing test will qualify for this course.
101. **UNDERSTANDING LITERATURE (3:3:0)** Introduction to the human and artistic values in selected short stories, novels, poems, and plays. Intended for nonmajors.
102. **GREAT BOOKS OF BRITISH LITERATURE (3:3:0)** Introduction to British literature through the reading and discussion of significant works. Intended for nonmajors.
103. **GREAT BOOKS OF AMERICAN LITERATURE (3:3:0)** Introduction to American literature through the reading and discussion of significant works. Intended for nonmajors.
104. **THE BIBLE AS LITERATURE (3:3:0)** Study of the English Bible as a literary and cultural document.
129. **SHAKESPEARE (3:3:0)** A selection of the major plays studied to determine the sources of their permanent appeal. Not recommended for English majors.
133. **MODERN AMERICAN LITERATURE TO WORLD WAR II (3:3:0)** Eliot, Frost, Faulkner, Fitzgerald, Hemingway, O'Neill, and other writers representative of the years between the world wars.
134. **AMERICAN COMEDY (3:3:0)** Studies in American comedy and satire, including such writers as Mark Twain, Faulkner, Vonnegut, and Heller.
139. **BLACK AMERICAN LITERATURE (3:3:0)** Fiction, poetry, and drama, including such writers as Baldwin, Douglass, Ellison, Morrison, and Wright.
140. **CONTEMPORARY LITERATURE (3:3:0)** Writers such as Barth, Beckett, Bellow, Ellison, Lowell, Mailer, Pinter, Plath, and Vonnegut.
165. **GREAT ENGLISH NOVELS (3:3:0)** Introduction to selected major novels by such writers as Defoe, Fielding, Austen, Bronte, Dickens, Hardy, Conrad, Joyce, Lawrence, and Woolf.
167. **POETRY (3:3:0)** Introduction to the appreciation and analysis of English and American poetry.
168. **DRAMA (3:3:0)** Introduction to the range of dramatic expression in selected plays, primarily English and American.
184. (C.Lit. 184) **THE SHORT STORY (3:3:0)** Lectures, discussions, readings in translation, with emphasis on major writers of the classical, medieval, Renaissance, and modern periods.
185. (C.Lit. 185) **THE MODERN NOVEL IN WORLD LITERATURE (3:3:0)** Development of the modern novel in the last century (outside the British Isles and the United States); lectures, discussions, readings in translation.
189. (C.Lit. 189) **FOUNDATIONS OF MODERN DRAMA (3:3:0)** Playwrights who set the world's stage for twentieth-century drama: Ibsen, Shaw, Chekhov, and Strindberg.
191. **SCIENCE FICTION (3:3:0)** Science fiction as the literature of technological innovation and social change—its development, themes, and problems.
192. **THE LITERATURE OF FANTASY (3:3:0)** Major realms of fantasy in English and American literature: daydream and nightmare, the pastoral, dystopia, utopia, apocalypse, and the heroic.
194. **WOMEN WRITERS (3:3:0)** Short stories, novels, poetry, drama, and essays by major English and American women writers since 1870.
196. (Folk. 196) **ESSENTIALS OF ANGLO-AMERICAN FOLKLORE (3:3:0)** A basic introduction to verbal and nonverbal folklore, stressing the basic procedures of collection, classification, and analysis.
197. **AMERICAN FOLK SONG IN THE ENGLISH (3:3:0)** British songs in America; native repertoires, white and Negro; folk ballad; and musical development.
201. **EXPOSITORY WRITING FOR SOCIAL SCIENTISTS (3:3:0)** Instruction in writing persuasive arguments about significant issues in the social sciences. Prerequisite: Engl. 15 or 30; fourth-semester standing.



211. **WRITING IN THE HUMANITIES (3:3:0)** Instruction in writing persuasive arguments about significant issues in the humanities. Prerequisites: Engl. 15 or 30; fourth-semester standing.
218. **TECHNICAL WRITING (3:3:0)** Writing for students in scientific and technical disciplines. Prerequisites: Engl. 15 or 30; fourth-semester standing.
219. **BUSINESS WRITING (3:3:0)** Writing reports and other common forms of business communication. Prerequisite: Engl. 15 or 30; fourth-semester standing.
297. **SPECIAL TOPICS (1-9)**
826. **REPORT WRITING (3:3:0)** Interpretation of statistical data and writing of technical reports. Prerequisite: Engl. 4 or 15.

## **FILM (FILM)**

180. **THE ART OF THE CINEMA (3:1:3)** The development of cinema to its present state; principles of evaluation and appreciation; examples from the past and present.

## **FINANCE (FIN)**

108. **PERSONAL FINANCE (3:3:0)** Personal management of budgets, bank accounts, loans, credit buying, insurance, real estate, and security buying. May not be scheduled by College of Business Administration students. Prerequisite: third-semester standing.
297. **SPECIAL TOPICS (1-9)**
301. **CORPORATION FINANCE (3:3:0)** The acquisition and management of corporate capital; analysis of operations, forecasting capital requirements, raising capital, and planning profits. Prerequisites: Acctg. 101; Econ. 2, 4; Math. 111; Q.B.A. 101.
810. **COMMERCIAL BANK MANAGEMENT (3:3:0)** Managerial processes within the banking industry.

## **FORESTRY (FOR)**

203. **FIELD DENDROLOGY (2:0:6)** Identification of trees and shrubs by leaf, fruit, bud, twig, and bark.
220. **FOREST ECOSYSTEM PROTECTION (3:3:0)** Principles and concepts involved in managing the forest ecosystem in regard to fires, insects, and diseases.
221. **FOREST FIRE TECHNOLOGY (1:0:3)** Technological aspects of controlling and using fire in the forest environment. Prerequisite: For. 220.
240. **SILVICULTURAL PRACTICES (3:2:3)** Principles and techniques of forest establishment, culture, regeneration, and harvesting. Prerequisite: For. 203.
241. **AERIAL PHOTO INTERPRETATION (4:2:6)** Aerial photo interpretation techniques applied to land management inventories, mapping, road location, and procurement. Prerequisites: For. 203; 804 and 806, or 366.
242. **ELEMENTS OF PROJECT SUPERVISION IN FORESTRY (3:3:0)** Supervisory techniques developed through an understanding of the behavioral sciences applied to field forestry personnel management.
250. **DENDROLOGY (3:0:6)** Taxonomy, identification, ranges, and uses of important U.S. timber species and lesser vegetation of a regional nature.
804. **FOREST MENSURATION (3:2:3)** Measurement of forests and forest products.
806. **FOREST INVENTORIES (3:2:3)** Application of land surveying and sampling techniques, including statistical analysis, for the determination of timber volume and growth.
807. **FOREST RECREATION (3:2:3)** Development, construction, and management of forest recreation areas and facilities. Prerequisite: For. 841.



## FRENCH

808. **FOREST PROTECTION (3:2:3)** Forest fire prevention, detection, behavior, and suppression; fire plans and statistics; insect and disease control.
809. **FOREST VALUATION (3:2:3)** Determination of forest values through a consideration of markets, logging and milling costs, stumpage appraisals, and other forest values. Prerequisite: For. 806.
814. **FORESTRY LEADERSHIP PRACTICUM (1:0:3)** Leadership techniques applied to standard forestry field operations. Prerequisite: For. 242.
817. **URBAN FORESTRY (3:2:3)** The application of land treatment techniques and forestry practices to urban environments. Prerequisites: For. 807.
818. **INDIVIDUAL STUDIES (1-3 per semester)** Individual study of forest technology.
820. **ADVANCED FOREST MEASUREMENTS (1)** Application of point and 3P sampling methods as a means of developing the data base for integrated forest management planning. Prerequisites: For. 809, 826.
821. **FIELD STUDIES IN ECOLOGY (1)** Field studies in ecological problems, challenges, and impacts related to normal forest practices in general resource management. Prerequisites: For. 809, 826.
822. **FOREST MANAGEMENT SYSTEMS (1)** Field projects in the integrated application of silvicultural, mensurational, and financial principles in forest management planning. Prerequisites: For. 809, 826.
824. **INTRODUCTION TO HARVESTING (1:0:3)** Practical instruction in the use and maintenance of hand tools and small power tools used in logging operations.
825. **HARVESTING TECHNIQUES (1:0:3)** Practical instruction in the operation of heavy equipment used in timber harvesting. Prerequisite: For. 824.
826. **REFORESTATION AND INTERMEDIATE OPERATIONS (1:0:3)** Field practicum in planting, pruning, thinning forest stands. Prerequisite: For. 825.
827. **FIELD STUDY PREPARATION (1)** Developing practices, procedures, and materials for conducting integrative field studies. Prerequisites: For. 241, 809.
828. **SAWMILL ORIENTATION (1:1:0)** An overview of sawmill industry equipment, processes, and products.
829. **SAWMILL BUSINESS MANAGEMENT (3:2:3)** Fundamental business practices applied to a small sawmill business enterprise. Prerequisite: For. 828.
830. **SAWMILL OPERATION (3:2:3)** Technical and applied aspects of sawmilling. Prerequisite: For. 828.
831. **SAWMILL OPERATION PRACTICUM (4)** Extended hands-on experience to develop operational competencies in running a small sawmill. Prerequisite: For. 830.
840. **LETTERING AND DRAFTING (2:1:4)** Freehand and transfer lettering skill development and drafting room practices.
841. **FOREST SURVEYING (4:2:8)** Plane surveying and mapping techniques as applied to forestry practices. Prerequisites: For. 840, Math. 807.

## FRENCH (FR)

1. **ELEMENTARY FRENCH (4:4:0)** Grammar, with reading and writing of simple French; oral and aural work stressed.
2. **ELEMENTARY FRENCH (4:4:0)** Grammar and reading continued; oral and aural phases progressively increased. Prerequisite: Fr. 1.
3. **INTERMEDIATE FRENCH (4:4:0)** Grammar, reading, composition, oral and aural exercises. Prerequisite: Fr. 2.
140. **FRENCH NOVEL IN ENGLISH TRANSLATION (1-6)** Readings of selected French masterpieces in translation; discussion of recurring themes in several literary periods.

## GEOGRAPHY (GEOG)

19. **GEOGRAPHY OF MAN'S ENVIRONMENT (3:2:2)** Survey and synthesis of processes creating geographical patterns of natural resources, with application of basic environmental processes in resource management.
20. **MAN'S WORLD: AN INTRODUCTION TO MODERN HUMAN GEOGRAPHY (3:3:0)** Spatial perspective on human societies in a modernizing world; regional examples; use of space and environmental resources; elements of geographic planning.
24. **ELEMENTS OF CULTURAL GEOGRAPHY (3:3:0)** Locational analysis of changes in non-Western cultures. Problems of plural societies, economic development, population growth, and settlement.
26. **HUMAN GEOGRAPHY (3:3:0)** Introduction to concepts, principles, and theories of spatial organization.

## GEOSCIENCES (GEOSC)

- \*1. **PHYSICAL GEOLOGY (3:2:3)** Earth processes and their effects on the materials, structure, and morphology of the earth's crust. Practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps.
- \*20. **OUR EARTH (3:2:2)** Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation.
- \*21. **EARTH HISTORY (3:2:2)** Evolution of the earth; changing patterns of mountains, lowlands, and seas; development of living organisms. Practicum includes field trips, studies of geologic maps, geologic problems, fossils.

## GERMAN (GER)

1. **BASIC GERMAN (4:3:2)** Listening, speaking, reading, writing; introduction to basic structures and vocabulary through dialogs and literary and cultural readings. Students may receive credit for only one of the following: Ger. 1, 11, or 15.
2. **BASIC GERMAN (4:3:2)** Listening, speaking, reading, writing; introduction to basic structures and vocabulary through dialogs and literary and cultural readings. Students may receive credit for only one of the following: Ger. 2, 12, or 16. Prerequisite: Ger. 1.
3. **INTERMEDIATE GERMAN (4:3:2)** Continued skill development; readings consisting of short literary and journalistic writings; increased attention to German cultural context. Students may receive credit for only one of the following: Ger. 3, 12, or 16. Prerequisite: Ger. 2.
11. **INTENSIVE BASIC GERMAN (6:5:2)** Listening, speaking, reading, writing basic structures and vocabulary through dialogs and literary and cultural readings. Students may receive credit for only one of the following: Ger. 1, 11, or 15. Prerequisite: Ger. 2.
12. **INTENSIVE INTERMEDIATE GERMAN (6:5:2)** Continued skill development of structures and vocabulary; listening, speaking, reading, writing. Taught on an accelerated basis. Students may receive credit for only one of the following: Ger. 2, 3, 12, or 16. Prerequisite: Ger. 11.
15. **READING GERMAN I (3:3:0)** Survey of German grammar, with readings in technical prose for students whose programs permit only two semesters of foreign language. Students may receive credit for only one of the following: Ger. 1, 11, or 15.
16. **READING GERMAN II (3:3:0)** Continuation of Ger. 15, with readings in the student's own field. Students may receive credit for only one of the following: Ger. 2, 12, or 16. Prerequisite: Ger. 15.
100. **GERMAN CULTURE AND CIVILIZATION (3:3:0)** Life of the German people from the early Middle Ages to modern times; their literature and arts, music, science, and philosophy. Conducted in English.

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\*This course includes from one to several field trips for which an additional charge will be made to cover transportation.

## HEALTH EDUCATION (HL ED)

13. STANDARD FIRST AID, PERSONAL SAFETY, AND CPR (1:1:1) Theoretical and technical aspects of standard first aid, personal safety, and cardiopulmonary resuscitation (CPR).
19. MAN AND DISEASE (1:1:0) Essentials of communicable and chronic disease control.
45. ALCOHOL AWARENESS EDUCATION (1:1:0) A course designed to raise awareness relative to the use and abuse of beverage alcohol.
46. INTRODUCTION TO HEALTH ASPECTS OF HUMAN SEXUALITY (1:1:0) An examination of health concerns related to sexuality and sexual behavior.
48. VALUES AND HEALTH BEHAVIOR (1:1:0) An exploration of opinions, beliefs, attitudes, and personal values as they relate to decision making and health behavior.
57. CONSUMER HEALTH (1:1:0) Essentials for determining credibility of claims for particular health services and products from a consumer's perspective.
303. EMERGENCY CARE (2:1:2) Competencies leading to American Red Cross Advanced First Aid and Emergency Care and American Heart Association Cardiopulmonary Resuscitation certification.
384. APPLIED KINESIOLOGY (3:2:2) Study of anatomical structure, body movement. Characteristic muscle action and motion will be analyzed in relation to physical therapy context. Prerequisite: Biol. 29.
800. PHYSICAL THERAPIST ASSISTANT – INTRODUCTION (3:2:2) Orientation to the field of physical therapy, historical background of the profession, professional ethics, medical terminology, and patient transportation techniques.
801. PHYSICAL THERAPIST ASSISTANT – PROCEDURES (4:2:4) General considerations for physical therapy modalities; development of skills and their application; diagnostic testing. Prerequisite: Hl.Ed. 800.
803. MEDICAL SURGICAL ORIENTATION TO THERAPY (3:3:0) Introduction to medical and postoperative conditions and/or disease states most frequently treated by physical therapy modalities. Prerequisites: Biol. 29, 41, 42.
804. THERAPEUTIC EXERCISE (3:2:4) Introduction to the principles of exercise in the treatment of disease and injury.
805. REHABILITATION (2:1:3) Examination of techniques and practical experience with appliances used in the rehabilitation of the physically disabled.
806. PHYSICAL THERAPIST ASSISTANT – PRACTICUM (10) The practice of physical therapist assistant skills in a clinical setting under the direct supervision of a registered physical therapist. Prerequisites: Hl.Ed. 804, 805.
807. TECHNIQUES FOR EFFECTIVE PATIENT INTERACTION (1:1:1) Techniques of interacting with the sick or disabled patient; emphasis will be on enhancing interaction skills. Prerequisite: Psy. 2.

## HEALTH PLANNING AND ADMINISTRATION (H P A)

101. INTRODUCTION TO HEALTH SERVICES ORGANIZATION (3:3:0) Examination of social, political, economic, historic, and scientific factors in the development and organization of the medical care health services.

## HISTORY (HIST)

1. THE WESTERN HERITAGE I (3:3:0) A survey of the Western heritage from the ancient Mediterranean world to the dawn of modern Europe.
2. THE WESTERN HERITAGE II (3:3:0) A survey of the Western heritage from the dawn of modern Europe in the seventeenth century to the present.
10. NON-WESTERN CIVILIZATIONS (3:3:0) Introduction to social, economic, and political evolution of non-Western cultures; responses to the West; modernization and development.



12. HISTORY OF PENNSYLVANIA (3:3:0) Chronological and topical survey, emphasizing immigration of diverse ethnic groups and religious, political, economic, and social developments, including industrialization and urbanization.
20. AMERICAN CIVILIZATION TO 1877 (3:3:0) An historical survey of the American experience from its colonial beginnings through the Civil War and Reconstruction.
21. AMERICAN CIVILIZATION SINCE 1877 (3:3:0) An historical survey of the American experience from the emergence of urban-industrial society in the late nineteenth century to the present.
100. ANCIENT GREECE (3:3:0) Greek world from the earliest Aegean cultures to the death of Alexander the Great and the beginnings of Hellenistic civilization.
101. THE ROMAN REPUBLIC AND EMPIRE (3:3:0) History of the Roman Republic and Empire from the origins of Rome to the disintegration of the Empire.
107. MEDIEVAL EUROPE (3:3:0) Rise and development of the civilization of medieval Europe from the decline of Rome to 1500.
120. EUROPE SINCE 1848 (3:3:0) Political, social, and ideological developments; origin and impact of two World Wars; totalitarianism and democracy; changing role in the world.
141. MEDIEVAL AND MODERN RUSSIA (3:3:0) Introductory survey, including political, social, economic, and cultural development of Kievan, Muscovite, and Imperial Russia.
142. HISTORY OF COMMUNISM (3:3:0) Marxism; Leninism and evolution of the Soviet Union; formation and development of the Communist bloc; impact of Chinese Communism.
143. HISTORY OF FASCISM AND NAZISM (3:3:0) The study of right-wing totalitarianism in the twentieth century, with special emphasis on Fascist Italy and Nazi Germany.
144. THE WORLD AT WAR: 1939-1945 (3:3:0) In-depth study of the origins and conduct of World War II. Political and economic aspects as well as military.
150. COLONIAL PENNSYLVANIA (3:3:0) Development of the colony of Pennsylvania through the war for American independence, covering immigration, economics, politics, religion, and society.
151. TECHNOLOGY AND SOCIETY IN AMERICAN HISTORY (3:3:0) Development of technology in America from colonial times; its reception and its influence on social, economic, and political life.
152. THE AFRO-AMERICAN EXPERIENCE (3:3:0) African roots; colonial and revolutionary experiences; slavery and abolitionism; civil war and reconstruction; accommodation and protest; the new militancy.
154. HISTORY OF WELFARE IN AMERICA (3:3:0) History of the care of dependent people (including children, the aged, mentally ill, unemployed) from colonial times to the present.
155. AMERICAN BUSINESS HISTORY (3:3:0) The development of business from the planting of the colonies, through the stages of industrialization, to the present.
156. (L.S. 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.
158. HISTORY OF AMERICAN IMMIGRATION (3:3:0) The waves of migration to America and an analysis of the resulting minority groups, their reception, assimilation, and persisting identity.
171. HISTORY OF MODERN SOUTHEAST ASIA (3:3:0) Sociopolitical survey of Southeast Asian history emphasizing the modern period. Origins of traditional civilization, colonialism and nationalism, problems of independence.
174. THE HISTORY OF TRADITIONAL EAST ASIA (3:3:0) Comparative cultural, institutional, and social history of traditional China and Japan to their contact with the industrialized West.
175. THE HISTORY OF MODERN EAST ASIA (3:3:0) Comparative survey of the internal developments and external relations of China and Japan since their contact with the industrialized West.
178. LATIN-AMERICAN HISTORY TO 1820 (3:3:0) Conquest of the New World, development of colonial institutions, impact on native cultures, and origins of independence movements.
179. LATIN-AMERICAN HISTORY SINCE 1820 (3:3:0) Origin, political growth, international relations, and economic status of the Latin-American republics, with emphasis upon present-day conditions.



## **HOTEL AND FOOD SERVICE**

181. **INTRODUCTION TO THE MIDDLE EAST (3:3:0)** Origins of Islamic civilization; expansion of Islam; the Ottoman Empire; the Middle East since 1918.
191. **EMERGING AFRICA (3:3:0)** Indigenous African societies; impact of Rome, Islam, and Europe; slave trade; colonialism; nationalism; problems since independence.
195. **HISTORY OF CANADA (3:3:0)** An integrated survey from French colonial beginnings to modern Dominion status, with special emphasis on relations with the United States.

## **HOTEL AND FOOD SERVICE (H F S)**

802. **SANITATION PRACTICES IN FOOD SERVICE OPERATIONS (3:3:0)** Practical applications related to the management of the sanitation subsystem within a food service operation.
804. **HOTEL AND FOOD SERVICE MERCHANDISING (3:3:0)** Merchandising as a system distributing benefits, collecting costs, concerned with motivating consumers. Topics include promotion, menu planning, and research methods.
805. **TRAINING AND SUPERVISION (3:3:0)** Methods and techniques of training and supervising food service and housing employees for overall efficiency of operation.
810. **FOODS EXPERIENCE (4:3:2)** Theory, observation, and practice in food services; emphasis on planning, preparation, and service in commercial food operations.
850. **FOOD SERVICE DELIVERY SYSTEMS (4)** Physical characteristics of principal food product groups considered. Topics include purchasing problems, preparation techniques, quality and cost control. Prerequisites: Acctg. 101, H.R.&I.M. 225.
860. **FOOD SERVICE SUPERVISION (4)** The principal food service administrative routines are considered from the point of view of the supervisor and middle manager. Prerequisite: H.F.S. 850.
870. **FOOD AND BEVERAGE ADMINISTRATION (4)** Components of food service systems are identified and studied as separate problems and as a total system. Prerequisite: H.F.S. 860.

## **HOTEL, RESTAURANT, AND INSTITUTIONAL MANAGEMENT (HR&IM)**

102. **INTRODUCTION TO CAREERS IN THE HOSPITALITY INDUSTRY (2:2:0)** Exploration and analysis of management opportunities in various segments of the hospitality industry.
225. **FOOD, BEVERAGE, AND LABOR COST CONTROL (3:3:0)** Techniques for analyzing and controlling food, beverage, and labor costs in hospitality organizations. Prerequisite: 3 credits in Accounting.
295. **ANALYSIS OF FIELD EXPERIENCE I (1:1:0)** Directed analysis and presentation of the 300-hour hospitality working experience, focusing on the physical and social environment.
320. **ENERGY MANAGEMENT IN THE HOSPITALITY INDUSTRY (3:3:0)** Principles governing energy usage and costs in heating, plumbing, refrigeration, air conditioning, and other equipment in hospitality operations. Prerequisite: H.R.&I.M. 295.

## **HUMAN DEVELOPMENT (H DEV)**

100. **INTRODUCTION TO HUMAN DEVELOPMENT (1:1:0)** Human development as a process of man-environment transactions, and the relationships of various fields to the study of that process.
101. **HUMAN GROWTH AND DEVELOPMENT (3:3:0)** Factors affecting human development, health, and behavior over the life-span: biological, environmental, psychosocial, community, and historical.
102. **POLICY AND PLANNING FOR HUMAN DEVELOPMENT (3:3:0)** Multidisciplinary analysis of concepts and practice in the creation and administration of social interventions for human development.

200. **EMPIRICAL INQUIRY IN HUMAN DEVELOPMENT (3:3:0)** Introduction to methods and philosophy of empirical inquiry applied to problems of human development.
395. **FIELD PROJECTS (1-12)** Independent study and research in a human service program; written and oral summary of rationale, procedures, findings.

## **HUMANITIES (HUMAN)**

1. **VALUES OF THE WESTERN CULTURAL HERITAGE (3:3:0)** Fundamental values of human experience as expressed in outstanding philosophical and literary works.
2. **SHAPING OF THE MODERN MIND (3:3:0)** Relevance to the present age of influential literary and philosophical texts illustrative of the principal epochs of Western civilization.
21. **IDEAS AND ARTS (3:3:0)** Interaction of intellectual and aesthetic values from the Renaissance to the present.
50. **THE LITERATURE AND LORE OF MINING (3:3:0)** Experience and values of mining tradition: survey of the literature and lore, including field experience.
101. **MODERN SCIENCE AND HUMAN VALUES (3:3:0)** Relationships of science to the aspirations, values, and arts of man.
102. **THE GRAND TOUR: A VISUAL SURVEY OF EUROPEAN HISTORY (3:3:0)** An historical interdisciplinary examination of the visual heritage of Italy, France, Germany, Spain, and the British Isles.

## **INDIVIDUAL AND FAMILY STUDIES (I F S)**

16. **EFFECTIVE INTERPERSONAL SKILLS (1:1:0)** Training in interaction skills required for the development and maintenance of satisfying interpersonal relationships.
129. **INTRODUCTION TO INDIVIDUAL AND FAMILY DEVELOPMENT (3:3:0)** Introduction to psychosocial and family development at all stages of the individual and family life cycle.
297. **SPECIAL TOPICS (1-9)**
315. **FAMILY DEVELOPMENT (3:3:0)** Family functions over the course of the family life-cycle; discussion of family problems and how families cope with them.
318. **FOUNDATIONS OF MARRIAGE (3:3:0)** Basic personal and social factors influencing the husband-wife relationship, with emphasis on marital interaction.
319. **FAMILY FINANCIAL MANAGEMENT (3:3:0)** How families plan their finances and factors that determine their decisions.
329. **INFANCY AND EARLY CHILDHOOD (3:3:0)** Theories, research findings, and methods in social/behavioral/biological sciences related to developmental processes and intervention during infancy/early childhood. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.
330. **OBSERVATION OR EXPERIENCE WITH PRESCHOOL CHILDREN (1-4)** Directed observations of, or supervised experience with, preschool children in group or home settings. Prerequisite: I.F.S. 329 or Psy. 213.
339. **LATER CHILDHOOD AND ADOLESCENCE (3:3:0)** Physical growth, development, and maturational processes. Agencies of socialization and adjustment systems in development, age six through adolescence. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.
349. **ADULT DEVELOPMENT AND AGING (3:3:0)** Physiological, psychological, and social development and change from young adulthood through old age; characteristic problems of the individual. Prerequisite: I.F.S. 129 or Psy. 2 or Soc. 1.

## **INDUSTRIAL ENGINEERING (I E)**

315. **INDUSTRIAL ORGANIZATION AND ADMINISTRATION (3:3:0)** Fundamental principles of organization leading to intelligent appreciation of the simpler problems of factory organization and operation. Students registered in Industrial Engineering may not schedule this course.

## INDUSTRIAL ENGINEERING TECHNOLOGY (I E)

805. ECONOMICS OF INDUSTRY (2:2:0) Internal economics of industrial enterprise, cost factors, and methods of comparing alternate proposals.

809. INSPECTION AND QUALITY CONTROL (3:2:2) Inspection methods and procedures and their applications to control and acceptance sampling based on statistical methods. Prerequisite: Math. 807.

811. MANUFACTURING MATERIALS AND PROCESSES (3:2:2) Mechanical properties of materials; primary processing methods used in manufacturing, emphasizing ferrous metals, their relationship to other metals and nonmetals.

812. MANUFACTURING PROCESSES (3:1:6) Technology related to metal removal, dimensional inspection, metal joining, hot and cold forming heat treating, metal casting, properties of materials. Prerequisite: I.E. 811.

815. PRODUCTION DESIGN (3:1:4) The planning, designing, and specifying of both standard and special tools required for the production of manufactured goods. Prerequisites: E.G. 803, I.E. 812.

830. SELECTED TOPICS IN INDUSTRIAL ENGINEERING TECHNOLOGY (3) Individual or group work in industrial engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## INSURANCE (INS)

102. PERSONAL INSURANCE PLANNING (3:3:0) Introduction to the principles and practices of personal insurance planning. May not be scheduled by College of Business Administration students. Prerequisite: third-semester standing.

301. RISK AND INSURANCE (3:3:0) Introduction to the principles and methods of handling business and personal risks; emphasis on insurance techniques. Prerequisite: fourth-semester standing.

800. INSURANCE PRINCIPLES (3:3:0) Introductory survey of all lines of insurance for handling business and personal risks.

810. LIFE INSURANCE (3:3:0) The life insurance contracts as methods of treating the problems of premature death and superannuation. Prerequisite: Ins. 800.

820. PROPERTY AND CASUALTY INSURANCE (3:3:0) Fundamental principles of property and casualty insurance. Prerequisite: Ins. 800.

830. INSURANCE PRACTICUM (3:3:0) Practical introduction to insurer operations in company and agency offices. Prerequisite: Ins. 820.

## INTERNATIONAL BUSINESS (I B)

862. INTERNATIONAL BUSINESS (3:3:0)

## INTERNATIONAL UNDERSTANDING (INT U)

200. INTERNATIONAL UNDERSTANDING AND WORLD AFFAIRS (3:3:0) Interdisciplinary consideration of international problems, conflict and accommodation; impact of various cultures and ideologies on world affairs and foreign policy. Credit will not be given for both this course and Pl.Sc. 14. Prerequisite: third-semester standing.

## JOURNALISM (JOURN)

200. THE MASS MEDIA AND SOCIETY (3:3:0) Mass communications in the United States; organization, role, content, and effects of newspapers, magazines, television, radio, books, and films. Not intended for students in the School of Journalism.



213. NEWS WRITING AND REPORTING (4:2:4) News and news values; legal and ethical problems of reporting; writing and reporting news for the mass media. Prerequisites: typing proficiency; and Engl. 30, fourth-semester standing; or Engl. 201 or 211.

250. WOMEN, MINORITIES, AND THE MEDIA (3:3:0) Analysis of historical, economic, legal, political, and social implications of the relationship between women, minorities, and the mass media.

## **LABOR STUDIES (L S)**

100. INDUSTRIAL RELATIONS (3:3:0) Introductory analysis of the employment relationship and of the interrelated interests of managements, workers, unions, and the public.

102. THEORIES AND FUNCTIONS OF LABOR ORGANIZATIONS (3:3:0) Study of the theory and practice of labor organizations: goals, internal structure and operations, and impact on society.

103. LABOR LAW (3:3:0) A study of legislation affecting labor organizations and their members.

104. THE PRACTICE OF COLLECTIVE BARGAINING (3:3:0) Study of the factors involved in negotiating labor contracts, the issues, processes, bargaining relationships, and public responsibilities facing the parties.

156. (Hist. 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.

296. INDEPENDENT STUDIES (1-18)

## **LIBRARY STUDIES (L ST)**

110. INFORMATION ORGANIZATION AND RETRIEVAL (3:2:2) Information structure and resources related to search and problem-solving procedures to identify, organize, and locate print and nonprint materials. Prerequisite: Engl. 15 or 30.

## **MANAGEMENT (MGMT)**

100. SURVEY OF MANAGEMENT (3:3:0) Introduction to organizational factors relevant to management processes, including leadership, motivation, job design, technology, organizational design and environments, systems, change. For non-Business students only.

802. SUPERVISORY MANAGEMENT (3:3:0) Preparation for supervisory positions in formal organizations. Emphasis placed on the motivational aspects of the supervisor's job. Prerequisite: Mgmt. 100.

## **MANAGEMENT INFORMATION SYSTEMS (M I S)**

800. INTRODUCTION TO MANAGEMENT INFORMATION SYSTEMS (3:3:0) Business computer systems and their impact on management decision making.

## **MARKETING (MKTG)**

220. PERSONAL SELLING (3:3:0) Principles underlying the sales process and practical application of these principles to selling situations. Studies role of selling in total marketing process. Prerequisite: third-semester standing.

221. CONTEMPORARY AMERICAN MARKETING (3:3:0) Social and economic aspects; movement of goods and services from producers to consumers; analysis of marketing functions, systems, and institutions. Students registered in the College of Business Administration may not schedule this course. Prerequisite: 3 credits in Economics.

801. PRINCIPLES OF MARKETING (3:3:0) Prerequisite: Mktg. 221.



## MATHEMATICS

802. **PROMOTION MANAGEMENT (3:3:0)** The application and management of various forms of persuasive communication with potential customers: personal selling, sales management, advertising, sales promotion. Prerequisite: Mktg. 801.
803. **PRINCIPLES OF RETAILING (3:3:0)** Introduction to the management of retailing organizations, with emphasis on decision making. Not open to retailing majors.
804. **PRINCIPLES OF RETAILING SALESMANSHIP (3:3:0)** Principles of selling applied to the retail level of trade; practical application of these principles in various sales situations.
805. **RETAILING I (3:3:0)** An analysis of the management and merchandising policies of various types of retailing institutions.
806. **RETAILING II (3:3:0)** Merchandising, promotion, and control policies of retail store management. Prerequisite: Mktg. 805.
807. **INTRODUCTION TO MARKETING RESEARCH (3:3:0)** Managerial aspects of marketing research, with emphasis on practical details of operating a small-scale project. Prerequisites: Mktg. 221, Q.B.A. 801.
808. **PRINCIPLES OF EFFECTIVE PURCHASING (3:3:0)** Introduction to the purchasing function in organizations, with emphasis on integration of purchasing activity with other aspects of marketing management. Prerequisite: Mktg. 221.
809. **PRODUCT PLANNING AND DEVELOPMENT (3:3:0)** Problems faced by the product or branch manager including those of planning, research, and consumer satisfaction. Prerequisite: Mktg. 221.
810. **PRINCIPLES OF INDUSTRIAL MARKETING (3:3:0)** Introduction to the management of industrial marketing strategy. Emphasizes strategic response to industrial marketing opportunities and response to competition. Prerequisite: Mktg. 221.

## MATHEMATICS (MATH)

4. **INTERMEDIATE ALGEBRA (3:3:0)** Polynomials, fractions, exponents, radicals, first- and second-degree equations and inequalities, sequences, systems of equations. Limited to students indicating deficiencies on the mathematics (algebra) proficiency examination. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*
5. **COLLEGE ALGEBRA I (3:3:0)** Polynomial and rational expressions; exponents and radicals; equations and inequalities; functions, relations, and their graphs. Prerequisite: Math. 4 or satisfactory performance on the mathematics (algebra) proficiency examination.
6. **PLANE TRIGONOMETRY (3:3:0)** Trigonometric functions; solutions of triangles; trigonometric equations; identities, complex numbers. Prerequisites: Math. 5 or satisfactory performance on the mathematics (algebra) proficiency examination; 1 unit of geometry.
17. **FINITE MATHEMATICS (3:3:0)** Introduction to logic, sets, probability. Prerequisite: 2 units of high school mathematics.
18. **ELEMENTARY LINEAR ALGEBRA (3:3:0)** Matrices and vectors; transformations; systems of linear equations; convex sets and linear programming. Prerequisite: 2 units of high school mathematics.
35. **GENERAL VIEW OF MATHEMATICS (3:3:0)** Survey of mathematical thought in logic, geometry, combinatorics, and chance.
36. **INSIGHTS INTO MATHEMATICS (3:3:0)** Examples of mathematical thought in number theory, topology, theory of symmetry, and chance. Prerequisite: 1 unit of algebra or Math. 4.
110. **TECHNIQUES OF CALCULUS I (4:4:0)** Functions, graphs, derivatives, integrals, techniques of differentiation and integration, exponentials, improper integrals, applications. Students may take only one course for credit from Math. 110, 140, and 140A. Prerequisite: Math. 5 or satisfactory performance on the mathematics (algebra) proficiency examination.
111. **TECHNIQUES OF CALCULUS II (2:2:0)** Analytic geometry, partial differentiation, maxima and minima, differential equations. Prerequisite: Math. 110.

140. **CALCULUS WITH ANALYTIC GEOMETRY I (4:4:0)** Functions; limits; analytic geometry; derivatives, differentials, applications; integrals, applications. Students may take only one course for credit from Math. 110, 140, and 140A. Prerequisites: Math. 6, 7; or Math. 40; or Math. 41; or satisfactory performance on the mathematics (both algebra and trigonometry) proficiency examination.
141. **CALCULUS WITH ANALYTIC GEOMETRY II (4:4:0)** Derivatives, integrals, applications; sequences and series; analytic geometry; polar coordinates; partial derivatives. Prerequisite: Math. 140 or 140A.
220. **MATRICES (2:2:0)** Systems of linear equations; matrix algebra; eigenvalues and eigenvectors; linear systems of differential equations. Prerequisite: Math. 110 or 141.
230. **CALCULUS AND VECTOR ANALYSIS (4:4:0)** Three-dimensional analytic geometry; vectors in space; partial differentiation; double and triple integrals; integral vector calculus. Students who have passed either Math. 231 or 232 may not schedule Math. 230 for credit. Prerequisite: Math. 141.
231. **CALCULUS OF SEVERAL VARIABLES (2:2:0)** Analytic geometry in space; differential and integral calculus of several variables. Students who have passed Math. 230 may not schedule this course. Prerequisite: Math. 141.
232. **INTEGRAL VECTOR CALCULUS (2:2:0)** Multidimensional analytic geometry; potential fields; flux; Green's divergence and Stokes's theorem. Students who have passed Math. 230 may not schedule this course. Prerequisite: Math. 231.
250. **ORDINARY DIFFERENTIAL EQUATIONS (3:3:0)** First- and second-order equations; numerical methods; special functions; Laplace transform solutions; higher order equations. Students who have passed Math. 251 may not schedule this course for credit. Prerequisite: Math. 141.
251. **ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS (4:4:0)** First- and second-order equations; numerical methods; special functions; Laplace transform solutions; higher order equations; Fourier series; partial differential equations. Prerequisite: Math. 141.
800. **BUSINESS MATHEMATICS (3:3:0)** Operations with whole numbers, fractions and mixed numbers, decimals and percent, formulas and equations, percentages and interest, introduction to algebra.
807. **TECHNICAL MATHEMATICS (5:5:0)** Algebraic expressions, exponents, radicals, equations, graphs, systems of equations, trigonometric functions, solution of right triangles, vectors, complex numbers. Prerequisite: Math. 800 or satisfactory performance on the mathematics proficiency examination.
808. **TECHNICAL MATHEMATICS AND CALCULUS (4:4:0)** Logarithm, inverse trigonometric functions, trigonometric identities, inequalities, series, limits, differentiation, higher order derivatives, implicit differentiation, applications, indefinite and definite integrals. Prerequisite: Math. 807.

## MECHANICAL ENGINEERING TECHNOLOGY (M E)

800. **MECHANISMS (2:0:4)** Motion in machine elements; strength and properties of materials; design of machine elements. Prerequisite: E.Mch. 811.
805. **KINEMATICS (3:2:3)** Graphical and analytical studies of relative motions, instant centers, velocity and acceleration in plane motions, slider crank mechanisms, cams, gears, gear trains, and flexible connectors. Prerequisites: E.G. 1, E.Mch. 811.
807. **HEAT TRANSFER (3:3:0)** Basic principles of conduction, convection, and radiation, emphasizing practical applications.
810. **PRODUCT DESIGN (3:2:3)** Design of machine elements including levers, bearings, shafts, clutches, springs, and gears; selection of ball bearings and belts; design of small mechanical devices. Prerequisites: E.Mch. 813, M.E. 805.
830. **SELECTED TOPICS IN MECHANICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in mechanical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## METALLURGICAL ENGINEERING TECHNOLOGY

881. **ELEMENTARY THERMO AND FLUID DYNAMICS (4:4:0)** Basic problems in compressible fluid flow. Laws of dynamics and thermodynamics, mechanical properties of fluids, elementary heat transfer. Prerequisite or concurrent: Math. 808, Phys. 150.

882. **AIR RESOURCE MANAGEMENT (2:2:0)** Introduction to air pollution. Pollutants, sources, effects, air monitoring systems, air quality criteria and standards, governmental control programs and procedures.

884. **SAMPLING AND MONITORING PROGRAM (2:0:4)** Instrumentation and site selection, field data acquisition for major air pollutants, data analysis and evaluation.

## METALLURGICAL ENGINEERING TECHNOLOGY (MET E)

800. **METALLURGICAL LABORATORY PRACTICE (4:2:4)** Instruction and practice in various metallurgical techniques. Prerequisite: Chem. 11. Prerequisite or concurrent: Phys. 150.

801. **PRINCIPLES OF EXTRACTIVE METALLURGY (2:2:0)** An introduction to several metals' extraction processes using a problem-solving approach. Prerequisite: Chem. 12.

802. **PHYSICAL METALLURGY (3:2:2)** Structures of metals and alloys; structure manipulations; structure-property relationships. Prerequisites: Chem. 12, Phys. 150, Math. 807, Met.E. 800.

803. **MATERIALS TESTING (3:1:4)** Applications of testing procedures to determine properties of inorganic materials.

804. **FERROUS METALLURGY (3:2:2)** Making, shaping, and heat treatment of cast irons and steels. Prerequisites: Chem. 12, Met.E. 800.

805. **NONFERROUS METALLURGY (3:2:2)** Extraction of nonferrous metals from their ores and subsequent compositional adjustment by refining and alloying. Prerequisites: Chem. 12, Met.E. 800.

806. **SUMMER FIELD PRACTICE (3)** Practical experience in the metallurgical industries.

807. **METALLURGICAL OPERATIONS (1:0:3)** Plant trips to metals industries; classroom discussion with metallurgists concerning their work and the role of the metallurgical associate.

## METEOROLOGY (METEO)

3. **INTRODUCTORY METEOROLOGY (3:2:2)** Nontechnical treatment of fundamentals of modern meteorology; effect of weather and climate on man and his activities. A student who took Meteo. 2 may take the laboratory part of this course for 1 credit only.

## MICROBIOLOGY (MICRB)

106. **ELEMENTARY MICROBIOLOGY (2:2:0)** Importance of microorganisms in public health and disease, agriculture and industry; descriptive course for nontechnical students.

107. **ELEMENTARY MICROBIOLOGY LABORATORY (1:0:3)** Selected techniques with regard to recognition and enumeration of bacteria; effects of chemical and physical agents on microorganisms. Prerequisite or concurrent: Micrb. 106.

150. **INTRODUCTORY MEDICAL LABORATORY TECHNOLOGY (4:2:10)** Introduction to basic principles and procedures of clinical laboratory work. Practicum emphasizes proper collection, handling, and preparation of biological samples. Prerequisite: admission to 2-MLT program.

151. **SEMINAR AND PRACTICUM FOR MEDICAL LABORATORY TECHNICIANS (2-17 per semester, maximum of 28)** Lectures and laboratory sessions introduce methods and procedures, underlying principles, and their applications in clinical practice. Prerequisites: Micrb. 150, 201, 202, Chem. 34, Biol. 41.

*Unit A. Clinical Chemistry (9)* Basic principles and procedures for measuring chemical components of blood and other body fluids.

*Unit B. Clinical Microbiology/Serology (6)* Properties and identification of normal and abnormal microbial flora. Antigenantibody interactions of diagnostic importance.



*Unit C. Hematology (6)* Red and white blood cell identification and enumeration. Related procedures for diagnosing normal or disease states.

*Unit D. Immunohematology (5)* Immunologic considerations necessary for the transfusion of blood and blood products.

*Unit E. Urinalysis (2)* Identification of cellular and crystalline urinary sediments. Qualitative chemical analysis of urine.

201. **INTRODUCTORY MICROBIOLOGY (3:3:0)** Elementary principles of microbial and viral interrelationships, morphology, and physiology; relation to food, water, soil, industry, and disease processes. Prerequisite: Biol. 101.

202. **INTRODUCTORY MICROBIOLOGY LABORATORY (2:0:4)** Qualitative and quantitative techniques with regard to recognition of bacteria and their processes on a microscopic, colonial, and physiological basis. Prerequisite: Chem. 12. Prerequisite or concurrent: Micrb. 201.

## MINERAL PROCESSING (MN PR)

61. **INTRODUCTION TO COAL PREPARATION (3:3:0)** Theory and application of modern coal preparation practice. Sampling, crushing, sizing, gravity concentration, flotation, dewatering, drying; pollution control; flowsheets.

## MINING (MNG)

23. **MINERAL LAND AND MINE SURVEYING (3:0:9)** Surveying theory and practice applied to mineral lands and mines; traversing, leveling, mapping, shaft plumbing; stope, room, and development surveying. Prerequisites: E.G. 11, ½ unit of secondary school trigonometry.

30. **INTRODUCTION TO MINING ENGINEERING (3:2:3)** Examination, development, and exploitation of mineral deposits in case studies of mineral deposits and mines; unit operations, cycling, equipment, methods.

## MINING TECHNOLOGY (MNG T)

800. **MINING TECHNOLOGY ORIENTATION (1:0:2)** Films, slides, and lectures to acquaint the student with the coal mining industry and its impact on society.

801. **COAL MINING TECHNOLOGY (3:2:3)** Analysis of coal mining systems; integration of unit operations and mining methods for efficient mine production.

802. **MINE VENTILATION (3:2:3)** Quality and quantity analysis and control of mine atmosphere. Prerequisite or concurrent: Chem. 11, Phys. 150, Mng.T. 801.

803. **STRATA CONTROL (3:2:3)** Fundamentals of stresses and strains in rocks; virgin and concentrated stresses; roof support, subsidence, bursts, and stability control. Prerequisite: E.Mch. 811. Prerequisite or concurrent: Mng.T. 801.

804. **MINE PLANT TECHNOLOGY (3:2:3)** Electrical systems in mines; mechanical power applications and materials handling systems. Prerequisite: Phys. 150.

805. **MINE SYSTEMS TECHNOLOGY (3:2:3)** Quantitative methods of work measurement and their application to production and method study problems related to mines. Prerequisite: Mng.T. 801.

806. **MINE MANAGEMENT AND LAW (3:3:0)** The problems of the individual in coal mine management in relation to environment, employer, union, and law.

807. **ELECTRICAL MINE MACHINE CIRCUITS (3:2:3)** Topics of electrical power fundamentals, power and control circuits, motors and their mine applications will be covered. Prerequisite: Mng.T. 804.

808. **MINE POWER DISTRIBUTION (3:2:3)** Topics of high voltage circuits, underground transmission, power stations, power conversion, safety regulations, and power devices will be covered. Prerequisite: Mng.T. 804.

809. **MINE MACHINERY HYDRAULICS (3:2:3)** Topics of basic hydraulic principles and their application to mining and mine machinery will be covered. Prerequisites: Math. 807, Phys. 150.



## MUSIC

810. **MINE MACHINE DYNAMICS (3:2:3)** Topics on basic machines and their application to the principles of mine machine operation will be covered. Prerequisites: E.Mch. 811, Phys. 150.
811. **PRACTICUM IN MINE MAINTENANCE (3:0:9)** Field and shop techniques in procedures of electrical, mechanical, and hydraulic phases of mine maintenance will be covered. Prerequisites: Mng.T. 804, Phys. 150.
815. **SURFACE MINING TECHNOLOGY (3:2:3)** Analysis of surface mining systems; integration of unit operations and equipment utilization for efficient operation. Prerequisite: Mng.T. 800.
816. **ELEMENTS OF SURFACE MINE DESIGN (3:2:3)** Exploration methods, pit planning, and design; drilling and fragmentation; loading and haulage systems; and slope stability. Prerequisite: Mng.T. 815.
817. **SURFACE MINING PRODUCTION TECHNOLOGY (3:2:3)** Application of time study and work measurement to surface production. Efficiency of equipment usage and equipment utilization scheduling. Prerequisite: Mng.T. 815.
818. **SURFACE MINING HYDROLOGY (3:3:0)** Water control and treatment; hydrologic studies before and after mining; impoundments and water treatment. Prerequisites: Chem. 11; Geosc. 1 or 20 or 101.
819. **RECLAMATION TECHNOLOGY (3:3:0)** Spoil-bank reclamation and contour grading; revegetation and reclaimed land utilization.

## MUSIC (MUSIC)

5. **THE FUNDAMENTALS OF MUSIC APPRECIATION (3:3:0)** Recitation and lectures with recorded examples of melody, harmony, rhythm, vocal and instrumental timbre, form, and program and absolute music.
8. **RUDIMENTS OF MUSIC (3:3:0)** Introduction to the elements of music: notation, scales, meter, rhythm, intervals; basic chord structure. For non-Music majors.

## NUCLEAR ENGINEERING TECHNOLOGY (NUC E)

801. **RADIOLOGICAL SAFETY (2:2:0)** Discussion of basic radiation dose units, radiation monitoring techniques, biological effects of radiation, and government regulations. Prerequisite or concurrent: Nuc.E. 802.
802. **ELEMENTS OF NUCLEAR TECHNOLOGY (4:4:0)** Atomic and nuclear structure, electromagnetic radiation, nuclear radiations, nuclear interactions, neutron diffusion, and reactor materials. Prerequisites: Math. 808, Phys. 151.
803. **ELEMENTS OF NUCLEAR POWER GENERATION (3:3:0)** Survey of various reactor types, with emphasis on fuel heat removal and power generation, fuel fabrication and reprocessing. Prerequisites: Nuc.E. 802, M.E. 807.
804. **INTRODUCTION TO REACTOR TECHNOLOGY (3:3:0)** Steady state reactor theory, kinetic behavior of reactors, shielding, and reactor control systems. Prerequisite: Nuc.E. 802.
805. **PRINCIPLES OF MEASUREMENT (3:2:2)** A study of measurement in the nuclear industry, including the instruments used, accuracy of measurement, and statistical justification. Prerequisites: E.E. 814, Phys. 151.
812. **NUCLEAR TECHNOLOGY LABORATORY (3:1:4)** Laboratory study of radiation measurements and the diversified application of nuclear techniques. Prerequisites: Nuc.E. 801, 805.
814. **REACTOR TECHNOLOGY LABORATORY (3:1:4)** Laboratory study of basic reactor experiments, control rod calibration, critical experiment, etc. Emphasis placed upon reactor operations. Prerequisites: Nuc.E. 801, 805. Concurrent: Nuc.E. 804.
820. **ELECTRICAL GENERATION ORIENTATION (1:1:0)** Introduction and comparison of methods of generating electricity; description of the variety of occupations in the electrical generating industry.
821. **INTRODUCTORY BOILING WATER REACTOR TECHNOLOGY (1:1:0)** Introduction to the concept of commercial power generation of electricity through the use of a boiling water reactor.

822. **POWER PLANT QUALITY ASSURANCE/QUALITY CONTROL (1:1:0)** Introduction to concepts of quality assurance/quality control; historical development of standards and regulatory guides; specific applications to nuclear plants.

830. **SELECTED TOPICS IN NUCLEAR ENGINEERING TECHNOLOGY (3)** Individual or group work in nuclear engineering technology for students with specific occupational objectives. Prerequisite: third-semester standing.

## **NUTRITION (NUTR)**

150. **ELEMENTARY NUTRITION (2:2:0)** Fundamentals of nutrition and its relation to human health. Students who have passed Nutr. 251 may not schedule this course.

251. **INTRODUCTORY PRINCIPLES OF NUTRITION (3:3:0)** The nutrients: food sources and physiological functions as related to human growth and well-being throughout life; current nutrition issues. Students who have passed Nutr. 150 may not schedule this course.

252. **DIET THERAPY AND NUTRITION CARE IN DISEASE (4:3:1)** Principles of nutrition care to meet therapeutic needs, inpatient care, and rehabilitation. Prerequisite: Nutr. 251 or 801.

801. **NUTRITION COMPONENT OF THE FOOD SERVICE SYSTEM (3:3:0)** Introduction to basic nutrition principles and their application in a food service system.

## **OPERATIONS MANAGEMENT (OPMGT)**

801. **PRODUCTION AND OPERATIONS MANAGEMENT (3:3:0)** Quantitative tools and techniques used in managing the production function of a firm; including inventory control, production scheduling, capacity planning. Prerequisites: Mgmt. 100, Q.B.A. 801.

## **PHILOSOPHY (PHIL)**

1. **CRITICAL THINKING AND ARGUMENT (3:3:0)** Principles of correct thinking; deductive and inductive inference; use and misuse of language in reasoning.

2. **EXISTENTIALISM (3:3:0)** Exploration of a controversial modern mode of philosophizing about life, death, absurdity, and faith.

3. **ETHICS AND SOCIAL ISSUES (3:3:0)** Ethical issues such as war, privacy, crime and punishment, racism and sexism, civil liberties, affirmative action, abortion, and euthanasia.

4. **BASIC PROBLEMS OF PHILOSOPHY (3:3:0)** Issues such as the foundations of knowledge, the existence of God, the problem of freedom, and the nature of reality.

12. **ELEMENTS OF SYMBOLIC LOGIC (3:3:0)** Translating arguments into symbolic form and establishing validity. For nonscience majors.

100. **THE MEANING OF HUMAN EXISTENCE (3:3:0)** A study of some philosophical ways of viewing the purpose of life, the good life, and history and its meaning.

103. **MORAL VALUE (3:3:0)** Freedom, choice, and obligation in conduct; values and the foundations of ethics.

104. **ETHICS AND THE PROFESSIONS (3:3:0)** The philosophical basis for the ethics of professional practice; illustrations include law, business, public administration, journalism, engineering, teaching, medicine.

105. **INTRODUCTION TO THE PHILOSOPHY OF LAW (3:3:0)** Topics normally include concepts of law and responsibility, justice and punishment, legal ethics, and the limits of law.

106. **BUSINESS ETHICS (3:3:0)** A study of ethical issues which confront the business community. Designed primarily for majors in the College of Business Administration.

108. **SOCIAL AND POLITICAL PHILOSOPHY (3:3:0)** Philosophical analysis of political and communal order; theories of individual and group action within the structures of social obligation.

111. **ORIENTAL PHILOSOPHY (3:3:0)** Study of philosophical, aesthetic, and religious ideas in the classics of Eastern thought.

212. **SYMBOLIC LOGIC (3:3:0)** The logic of propositions, relations, and quantification; the nature and properties of formal systems. Intended primarily for science-oriented students.

## PHYSICAL EDUCATION (PH ED)

5. **PHYSICAL EDUCATION (1:0:3 per semester)** Full-semester activity courses to develop physical and recreational skills. Selection from aerobic dance, cross-country skiing, dancing, field hockey, golf, jogging, lacrosse, orienteering, outdoor living skills, personal fitness, sailing, scuba, strength training, tennis, and others.
6. **PHYSICAL EDUCATION (½:0:3 per first half of semester)** Activity to develop physical and recreational skills. Selection from archery, badminton, basketball, bowling, canoeing, fencing, figure skating, handball, hunter safety, racquetball, riflery, squash, swimming, volleyball, and others. First half semester course.
7. **PHYSICAL EDUCATION (½:0:3 per second half of semester)** See description for Ph.Ed. 6. Second half semester course.
9. **LIFE SAVING AND WATER SAFETY (1:0:3)** Course outlined by the American Red Cross; prepares the student for the Senior Life Saving examination. Prerequisite: passing of qualifying swimming test.
11. **WATER SAFETY INSTRUCTOR (1:0:3)** The American Red Cross aquatic instructor's course, including swimming, diving, life saving, water safety. Prerequisite: students wishing to take instructor's examination must have a recent Red Cross Senior Life Saving certificate.

## PHYSICAL SCIENCE (PH SC)

7. **PHYSICAL SCIENCE (3:3:0)** Development of physics, including modern physical concepts and their relationship to the careers of physical scientists. May not be scheduled by students who have received credit for Phys. 100, 201, 215, or 221.
8. **PHYSICAL SCIENCE (3:3:0)** Selected concepts of chemistry showing their development, interrelationship, and present status. May not be scheduled by students who have received credit for Chem. 11 or 12.

## PHYSICIAN'S ASSISTANT (P A)

800. **BASIC MEDICAL AND CLINICAL SCIENCES I (7:7:0)** Introduction to principles of the basic and clinical sciences related to providing care to patients in a primary-care setting.
801. **BASIC MEDICAL AND CLINICAL SCIENCES II (7:7:0)** Continuation of P.A. 800. Principles of the basic and clinical sciences related to providing care to patients in a primary-care setting. Prerequisite: P.A. 800.
805. **MICROBIOLOGY (1:1:0)** Introduction to the principles of clinical microbiology useful to a physician's assistant functioning in a primary-care setting.
810. **HUMAN BEHAVIOR (3:3:0)** Introduction to the principles of psychiatry and behavioral medicine relevant to medical care in the primary-care setting.
820. **PATIENT-ORIENTED CARE I (3:2:8)** Introduction of a comprehensive approach to care of the patient in the family context.
821. **PATIENT-ORIENTED CARE II (3:2:8)** Continuation of P.A. 820. Introduction to patient and family care in the context of health care systems. Prerequisite: P.A. 820.
840. **CLINICAL SKILLS FOR PHYSICIAN'S ASSISTANT I (2:1:4)** Technical skills development necessary to prepare the student in the clinical skills areas required during the primary health care practicum.
841. **CLINICAL SKILLS FOR PHYSICIAN'S ASSISTANT II (2:1:4)** Continuation of P.A. 840. Technical skills development necessary to prepare the student in the clinical skills areas required during the primary health care practicum. Prerequisite: P.A. 840.
850. **THERAPEUTICS (3:3:0)** Introduction to basic applied clinical pharmacology with emphasis on chemical therapeutic agents commonly used with primary-care patients.
870. **PEDIATRICS (1:1:0)** Introduction to the principles of pediatric primary care.
871. **GERIATRICS (1:1:0)** Introduction to the unique social, psychological, and medical-surgical problems of the aging patient.



878. CATEGORICAL EXPERIENCES (9:0:40) Clinical rotations in categorical areas appropriate to physician's assistant clinical skills development.

880. PRACTICUM IN PRIMARY HEALTH CARE DELIVERY I (15:0:40) Preceptorship with primary-care physician. Emphasis on health appraisal, evaluation of patient problems, and implementation of care. Prerequisite: P.A. 878.

881. PRACTICUM IN PRIMARY HEALTH CARE DELIVERY II (15:0:40) Continuation of P.A. 800. Preceptorship with primary-care physician. Emphasis on health appraisal, evaluation of patient problems, and implementation of care. Prerequisite: P.A. 880.

## PHYSICS (PHYS)

150. TECHNICAL PHYSICS (3:2:2) Elementary treatment of topics in mechanics, heat, wave motion, and sound leading toward an understanding of technical applications. Prerequisite: 1½ units of algebra. Prerequisite or concurrent: Math. 807.

151. TECHNICAL PHYSICS (3:2:2) Elementary treatment of topics in electricity, light, and modern physics leading toward an understanding of technical applications. Prerequisite: Phys. 150.

201. GENERAL PHYSICS (4:4:0) Mechanics. Concurrent: Math. 140.

202. GENERAL PHYSICS (4:3:2) Electricity and magnetism. Prerequisite: Phys. 201. Concurrent: Math. 141.

203. GENERAL PHYSICS (3:3:0) Wave motion and thermodynamics. Prerequisite: Phys. 202.

204. GENERAL PHYSICS (4:3:2) Wave motion and thermodynamics, with laboratory. Prerequisite: Phys. 202.

215. INTRODUCTORY PHYSICS (4:3:2) Selected topics in mechanics, heat, and sound. Prerequisite: algebra to quadratics.

237. INTRODUCTION TO QUANTUM PHYSICS (3:3:0) Relativity and quantum theory applied to selected topics in atomic, molecular, solid state, and nuclear physics. Concurrent: Phys. 203 or 204.

265. INTRODUCTORY PHYSICS (4:3:2) Selected topics in light, electricity, and magnetism. Prerequisite or concurrent: Phys. 215.

297. SPECIAL TOPICS (1-9)

## POLITICAL SCIENCE (PL SC)

1. AMERICAN NATIONAL GOVERNMENT (3:3:0) Development and nature of American political culture; constitutional and structural arrangements; policy-making processes; sources of conflict and consensus.

2. AMERICAN PUBLIC POLICY (3:3:0) Examination of selected areas of public policy in America. Analysis of policy content, alternatives, and impact. Prerequisite: Pl.Sc. 1.

3. GOVERNMENT AND POLITICS IN MODERN SOCIETY (3:3:0) Introduction to study of government and politics. Normative and empirical theories; governmental functions in modern communities; representative structures and processes.

14. INTERNATIONAL RELATIONS (3:3:0) Characteristics of modern nation-states and forces governing their international relations; nationalism; imperialism; diplomacy; current problems of war and peace. Credit will not be given for both this course and Int.U. 200.

20. COMPARATIVE POLITICS—WESTERN EUROPE (3:3:0) Comparative analysis of political cultures, interest groups, parties, and decision-making processes in principal Western European political systems.



## PSYCHOLOGY (PSY)

2. PSYCHOLOGY (3:3:0) Introduction to general psychology; principles of human behavior and their applications.
15. ELEMENTARY STATISTICS IN PSYCHOLOGY (4:3:2) Frequency distributions and graphs; measure of central tendency and variability; normal probability curve; elementary sampling and reliability; correlations; simple regression equations. Prerequisites: Psy. 2; Math. 5 or 2 units of secondary school algebra.
21. CURRENT APPLICATIONS OF PSYCHOLOGY (3:3:0) Topics may be drawn from but not limited to opinion research, selection and placement, behavior modification, attitude measurement and change. Prerequisite: Psy. 2.
37. MENTAL HEALTH (3:3:0) Maintaining adjustment, developing a well-balanced personality; behavior disorders and their treatment. May not be used as a prerequisite for any course in Psychology. Not open to Psychology majors or those who have received credit for Psy. 437.
170. PSYCHOLOGY OF WOMEN (3:3:0) Psychology of women in historical perspective and present involvement. Stresses women's self-concepts with relation to individual and social psychological health. Prerequisite: Psy. 2.
174. (Soc. 174) PSYCHOLOGICAL AND SOCIOLOGICAL ASPECTS OF DEATH (3:3:0) An introductory, interdisciplinary approach to the psychology and sociology of death, stressing the significance of, and attitudes toward, mortality. Prerequisites: Psy. 2, Soc. 1.
202. INTRODUCTION TO PERCEPTION (3:3:0) Survey of human perception and processing of perceptual information, with some reference to animal literature. Emphasizes vision and audition. Prerequisite: Psy. 2.
203. NEUROLOGICAL BASES OF HUMAN BEHAVIOR (3:3:0) An introduction to biopsychology, emphasizing the structure and function of the human brain.
204. INTRODUCTION TO LEARNING (3:3:0) A general survey of the learning area, including animal and human experiments, with the applicability of learning principles being discussed. Prerequisite: Psy. 2.
211. VOCATIONAL BEHAVIOR (3:3:0) Theories of vocational selection and career change; research and application.
213. INTRODUCTION TO DEVELOPMENTAL PSYCHOLOGY (3:3:0) Developmental principles; physical growth; linguistic, intellectual, emotional, and social development from infancy to maturity. Prerequisite: Psy. 2.
220. (Ling. 120) INTRODUCTION TO PSYCHOLINGUISTICS (3:3:0) The learning of language; language development in the child; meaning as a problem for psychology. Prerequisite: Psy. 2.
221. INTRODUCTION TO COGNITIVE PSYCHOLOGY (3:3:0) Introduction to study of such higher mental processes as thinking and reasoning, imagery, concept formation, problem solving, and skilled performance. Prerequisite: Psy. 2.
231. INDUSTRIAL PSYCHOLOGY (3:3:0) Personnel selection, training, accident prevention, morale, and organizational behavior. Prerequisites: Psy. 2; Psy. 15 or Stat. 200.
236. (Rl.St. 236) PSYCHOLOGIES OF RELIGION (3:3:0) Introduction to major Western psychologies of religion (James, Freud, Jung) and to subsequent extensions of and departures from them.
237. (Rl.St. 237) RELIGIONS, CULTURES, AND THERAPIES (3:3:0) Comparison of methods and goals of selected religious and secular therapies within their cultural contexts. Prerequisite: Psy. 2.
296. INDEPENDENT STUDIES (1-18)

## QUANTITATIVE BUSINESS ANALYSIS (Q B A)

101. INTRODUCTION TO QUANTITATIVE BUSINESS ANALYSIS (3:3:0) Introduction to quantitative methods for conceptualizing business and management problems. Prerequisite: Math. 18 or 110.

102. **ELEMENTARY BUSINESS STATISTICS (3:3:0)** Statistical inference; estimation, hypothesis testing, testing, correlation, and regression; application of statistical techniques to economic and business problems. Prerequisite: Q.B.A. 101.

801. **ELEMENTARY BUSINESS STATISTICS (3:3:0)** Collection, tabulation, measurement, presentation, and interpretation of quantitative material. Prerequisite: third-semester standing.

## **RADIOLOGIC TECHNOLOGIST RADIOGRAPHER (R T R)**

1. **HISTORY OF RADIOLOGY; ELEMENTARY RADIATION PROTECTION; MEDICAL ETHICS (1:2:6)** History of radiology field, basic principles of radiation protection, applications of medical ethics, base office procedures, departmental structure.

20. **MEDICAL TERMINOLOGY; RADIOGRAPHIC POSITIONING I (1:3:5)** Introduction to the medical profession's language; basic positional terminology, emphasis on skeletal positioning with skull introduction.

30. **RADIOGRAPHIC EXPOSURE I; FILM CRITIQUE I (1:3:5)** Preliminary exposure factors concerning radiographic imaging; evaluation of radiographic films.

40. **RADIOGRAPHIC POSITIONING II: CONTRAST PROCEDURES; NURSING PROCEDURES (5:3:13)** Body system positionings; radiologic applications on contrast media, nursing procedures pertinent to radiologic technology. Prerequisite: R.T.R. 20.

50. **RADIOGRAPHIC EXPOSURE II (1:2:5)** Emphasis on problem solving and formation of technique chart. Prerequisite: R.T.R. 30.

60. **DARKROOM CHEMISTRY; FILM CRITIQUE II (1:3:5)** Film composition, manifestation of latent image and film processing techniques; continuation evaluation of radiographic films. Prerequisites: Chem. 11, R.T.R. 30.

70. **RADIOGRAPHIC POSITIONING III (1:2:6)** Review of skeletal, skull, and body systems; emphasis on pediatric, geriatric, psychiatric, and intra-oral radiography. Prerequisite: R.T.R. 40.

80. **SPECIAL PROCEDURES; REGISTRY REVIEW (1:5:14)** Invasive contrast procedures pertinent to radiology. Tomography, paradiologic imaging modalities; review for registry examination. Prerequisite: R.T.R. 70.

90. **Medical and Surgical Diseases; REGISTRY REVIEW II (1:3:14)** Review for registry examination, definition of various diseases, and pathology pertaining to bodily systems. Prerequisites: Biol. 41, R.T.R. 80.

## **READING, COMMUNICATION, AND LANGUAGE EDUCATION (RCLED)**

5(A,B). **COLLEGE READING SKILLS IMPROVEMENT (2 each)** Improving reading comprehension, vocabulary, rate, study skills, and integrating these more efficiently in course work.

*Unit A:* Average or better readers seeking advanced work or preparation for specific goals.

*Unit B:* Limited to students needing developmental reading instruction and recommended on the basis of reading entrance test scores.

## **REAL ESTATE (R EST)**

100. **SURVEY OF REAL ESTATE (3:3:0)** Study of real estate to enable individuals to make successful transactions and decisions. Not available to Business students or to those who have taken R.Est. 301.

301. **REAL ESTATE PRINCIPLES (3:3:0)** Introduction to urban real estate; economic forces affecting property rights; real estate markets and finance; land-use analysis; and government policies.

800. REAL ESTATE PRINCIPLES (3:3:0) Nature of the real estate market; introduction to the functions performed in the real estate business.
810. REAL ESTATE SALES (3:3:0) Principles underlying the sale of real estate; the use of selling tools and procedures in the analysis of customers' needs.
830. REAL ESTATE FINANCE (3:3:0) Basic principles of real estate finance; sources of funds for financing real estate.

## RELIGIOUS STUDIES (RL ST)

1. INTRODUCTION TO THE STUDY OF RELIGION (3:3:0) An historical and comparative survey of the principal beliefs and practices of the world's major religions.
19. RELIGION IN AMERICAN LIFE AND THOUGHT (3:3:0) The function, contributions, tensions, and perspectives of religion in American culture.

## RETAILING (RTL)

840. MANAGEMENT IN THE HOME (3:3:0) The principles of decision making, work simplification, use of equipment, and home safety applied to family management.
850. DISPLAY TECHNIQUES (2:1:3) Display as visual communication, emphasizing the techniques related to merchandising and art. Prerequisite: an art or art appreciation course.

## SCIENCE, TECHNOLOGY, AND SOCIETY (S T S)

100. THE ASCENT OF MAN (3:3:0) A survey of some of the intellectual achievements which highlight mankind's attempts to understand nature and shape the environment.

## SOCIAL SCIENCE (SO SC)

1. THE URBANIZATION OF MAN: A SOCIAL SCIENCE PERSPECTIVE (3:3:0) An overview of the social sciences, including an interdisciplinary analysis of the urban process.
2. CONTEMPORARY MAN AND SOCIETY (3:3:0) Selected contemporary issues in the perspective of history, sociology, psychology, economics, and political science.
110. INTRODUCTION TO CONTEMPORARY AFRICA (3:3:0) Consideration of influences and forces at work; leaders, elites, and groups. Analysis of problems and issues in Africa.
297. SPECIAL TOPICS (1-9)

## SOCIOLOGY (SOC)

1. INTRODUCTORY SOCIOLOGY (3:3:0) The nature and characteristics of human societies and social life.
3. INTRODUCTORY SOCIAL PSYCHOLOGY (3:3:0) The impact of the social environment on perception, attitudes, and behavior.
5. SOCIAL PROBLEMS (3:3:0) Current social problems such as economic, racial, and gender inequalities; social deviance and crime; population, environmental, energy, and health problems.
7. INTRODUCTION TO SOCIAL RESEARCH (3:3:0) Fundamental concepts and problems in social science research; design, measurement, sampling, causation, validity, interpretation. Prerequisite: 3 credits in Sociology.
15. URBAN SOCIOLOGY (3:3:0) City growth and decline; impact of city life on individuals, families, neighborhoods, and government; urban life-styles.
30. SOCIOLOGY OF THE FAMILY (3:3:0) Family structure and interaction; functions of the family as an institution: cross-cultural comparisons.



## SOLAR TECHNOLOGY (S T)

801. INTRODUCTION TO SOLAR TECHNOLOGY (2:1:2) Introduction to solar technology from the standpoint of history, ecology, and energy.
804. ANALYSIS OF SOLAR HEATING AND COOLING SYSTEMS (3:1:5) Comprehensive analysis and application of solar heating and cooling systems. Calculations and layout. Prerequisite: fourth-semester standing.
806. PASSIVE SYSTEMS AND CONSERVATION METHODS (3:3:0) Passive concepts and designs; earth sheltering; energy audits and conservation techniques; wood burning equipment.
807. LIQUID SPACE HEATING AND DOMESTIC HOT WATER SYSTEMS (3:2:2) Liquid collectors, storage, and domestic hot water systems; pumps and piping; heat exchangers; fluid and component selection; power and controls. Prerequisites: S.T. 801, M.E. 881.
808. AIR SYSTEMS AND CONVENTIONAL HEATING EQUIPMENT (3:2:2) Air collector and storage systems; fans and ductwork; heat exchange coils; controls; conventional-fired equipment operation. Concurrent: S.T. 807.
809. Nontechnical Aspects of Solar Technology (3:2:2) System sizing with f-chart method; economic analysis techniques; cost estimating; job scheduling; legal aspects; warranties; solar cooling methods and economics. Prerequisite: S.T. 801.
830. SELECTED TOPICS IN SOLAR HEATING AND COOLING TECHNOLOGY (3) Individual or group work in solar heating and cooling technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## SPANISH (SPAN)

1. ELEMENTARY SPANISH (4:3:2) Audio-lingual approach to basic Spanish; writing.
2. ELEMENTARY SPANISH (4:3:2) Audio-lingual approach to basic Spanish continued; writing. Prerequisite: Span. 1.
3. INTERMEDIATE SPANISH (4:3:2) Audio-lingual review of structure; writing; reading. Prerequisite: Span. 2.
10. INTENSIVE SPANISH (6:5:2) Basic Spanish grammar; oral, aural, and writing skills. Essentially equivalent to Span. 1, 2, 3, but in accelerated five period per week module.
20. INTENSIVE SPANISH (6:5:2) Continuation of Span. 10. Prerequisite: Span. 10.
130. IBERIAN CIVILIZATION (3:3:0) Spanish and Portuguese life from the medieval period to the present; literature, the arts, and contemporary problems in historical perspective.
131. IBERO-AMERICAN CIVILIZATION (3:3:0) Spanish American and Brazilian life from the Conquest to the present: literature, art, the indigenous heritage, and contemporary problems.
230. MASTERPIECES OF SPANISH LITERATURE IN ENGLISH TRANSLATION (3:3:0) Emphasis on works and authors of international importance. Lectures, readings, and written work in English.
231. MASTERPIECES OF SPANISH AMERICAN LITERATURE IN ENGLISH TRANSLATION (3:3:0) Emphasis on works and authors of international importance. Lectures, readings, and written work in English.

## SPEECH COMMUNICATION (SPCOM)

100. EFFECTIVE SPEECH (3:3:0) Introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.
- Unit A.* Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation.
- Unit B.* Principles of communication, implemented through group problem solving, with some attention to formal speaking and message evaluation.
- Unit C.* Principles of communication, implemented through analysis and evaluation of messages, with some attention to formal speaking and group discussion.
240. FOUNDATIONS OF TELECOMMUNICATIONS (3:3:0) Examination of oral, scribal, print, industrial, and electronic cultures; analysis of impact of technology on communications and social structure.



## STATISTICS

295. **INTERNSHIP (1-16)** Supervised nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required. Prerequisite: prior approval of proposed assignment by instructor.

296. **INDEPENDENT STUDIES (1-18)**

335. **INTRODUCTION TO AUDIO AND VIDEO COMMUNICATIONS (3:2:2)** Introduction to audio and video studio procedures and techniques within the context of human communication.

340. **THEORY AND TECHNIQUES OF AUDIO PRODUCTION (3:2:2)** Intermediate course; audio in human communication; comparison of audio forms; development of production skills; aesthetic interpretation of production. Prerequisite: Sp.Com. 335.

345. **THEORY AND TECHNIQUES OF VIDEO PRODUCTION (3:2:2)** Intermediate level; video in human communication; organizational structure of video systems; production, analytical skills for mass and submass audience presentations. Prerequisite: Sp.Com. 335.

380. **ORAL INTERPRETATION (3:3:0)** Principles of oral interpretation of the printed page with practice in oral reading of poetry, prose, and drama.

## STATISTICS (STAT)

200. **ELEMENTARY STATISTICS (4:3:2)** Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. Prerequisite: 2 units in algebra.

318. **ELEMENTARY PROBABILITY (3:3:0)** Combinatorial analysis, axioms of probability, conditional probability and independence, discrete and continuous random variables, expectation, limit theorems, additional topics. Prerequisite: Math. 141.

## TELECOMMUNICATIONS (TELCM)

840. **INTRODUCTION TO TELECOMMUNICATIONS SYSTEMS (1:1:0)** Elements of telecommunications systems, including telephones, transmission lines, switching, digital data, and transmission by microwave, satellite, and fiber optics.

841. **SWITCHING AND TRAFFIC (3:3:0)** Routing of telecommunications messages: characteristics, methods, and control. Prerequisite: Telcm. 840.

842. **SWITCHING AND TRAFFIC LABORATORY (1:0:2)** Measuring equipment for telecommunications systems. Prerequisite or concurrent: Telcm. 841.

843. **TRANSMISSION (3:3:0)** Transmission of telecommunications information, including design problems. Prerequisite: Telcm. 840.

844. **TRANSMISSION LABORATORY (1:0:2)** Installation, alignment, and operation of telecommunication equipment. Prerequisite or concurrent: Telcm. 843.

## THEATRE ARTS (THEA)

100. **THE ART OF THE THEATRE (3:3:0)** Survey of the history, craft, and art of the theatre to support an informed appreciation of theatrical events.

102. **FUNDAMENTALS OF ACTING (3:3:0)** Introduction to performance skills for the student with a general interest in acting.

103. **FUNDAMENTALS OF DIRECTING (3:3:0)** Training and experience in basic skills of directing. Designed for non-Theatre majors.

104. **FUNDAMENTALS OF THEATRE PRODUCTION (3:3:0)** Training and experience in basic skills of technical theatre. Designed for non-Theatre majors.

109. **THE DRAMATIC ARTS IN THE MASS MEDIA (3:3:0)** The place of television-radio-film drama in our culture; relationship with other art forms; standards of evaluation.

210. **INTRODUCTION TO CREATIVE DRAMATICS (3:1:4)** Introduction and direct experience in creative dramatics and survey of children's theatre.

296. **INDEPENDENT STUDIES (1-18)**

**WILDLIFE (WIDL)**

801. **INTRODUCTION TO WILDLIFE MANAGEMENT (3:3:0)** Basic principles of wildlife management. Introduction to general ecology and wildlife population dynamics.
802. **RECONNAISSANCE SURVEYS (3:2:3)** Use of topographic maps and hand-held compasses; survey methods using the staff compass, abney level, steel tape, and pacing. Reconnaissance mapping.
803. **ANIMAL IDENTIFICATION (3:2:3)** Identification of mammals, birds, reptiles, amphibians, and fishes; introduction to their life histories.
804. **WILDLIFE MENSURATION (3:3:0)** Estimation and analysis of animal populations, including sampling considerations and basic biometry. Prerequisite: 3 credits in mathematics.
805. **FIELD AND LABORATORY TECHNIQUES (3:2:8)** Techniques used in wildlife research and management. Prerequisites: Wildl. 801, 802, 803, For. 203. Concurrent: Wildl. 806.
806. **OPERATIONAL PROCEDURES AND EQUIPMENT (2:2:6)** Operational procedures for wildlife-related equipment and facilities; field trips to wildlife management areas. Concurrent: Wildl. 805.
807. **OUTDOOR RECREATION (3:2:3)** Sociology, history, and economics of recreational demand; recreational areas and management procedures.
808. **TERRESTRIAL WILDLIFE MANAGEMENT (3:1:6)** Ecological characteristics and manipulation of terrestrial habitats; control of wildlife populations. Prerequisites: Wildl. 801, 802, 803, 804, For. 203, 240.
809. **ANIMAL HANDLING AND CARE (3:2:3)** Techniques in capturing, marking, and maintaining wild animals in captivity. Necropsy procedures to determine physical condition and cause of death. Prerequisite: Wildl. 801.
811. **AERIAL PHOTO INTERPRETATION (4:2:6)** Techniques of photo interpretation; type mapping of wildlife environments; photo censusing of wild animals.
813. **WETLANDS AND FISHERIES MANAGEMENT (3:3:3)** Introduction to basic limnology. Ecology and management of swamp, marsh, pond, and stream habitats and their animal populations. Prerequisites: Wildl. 801, 802, 803, 804.

**WOMEN'S STUDIES (WMNST)**

200. **WOMEN'S STUDIES (3:3:0)** Interdisciplinary consideration of the scholarly theories and research pertaining to women's experiences and women's status in contemporary American society.

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86/88

# Bulletin

1986-1988

The Pennsylvania State University

## Associate Degree Programs





# **Bulletin**

**1986-1988**

**The Pennsylvania State University**

**Associate  
Degree  
Programs**

#### STATEMENT OF NONDISCRIMINATION

The Pennsylvania State University, in compliance with federal and state laws, is committed to the policy that all persons shall have equal access to programs, admission, and employment without regard to race, religion, sex, national origin, handicap, age, or status as a disabled or Vietnam-era veteran. Direct inquiries to the Affirmative Action Officer, Suzanne Brooks, 201 Willard Building, University Park, PA 16802; (814) 863-0471.

#### REGULATIONS SUBJECT TO CHANGE

Each step of the educational process, from admission through graduation, requires continuing review and appropriate approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

THE PENNSYLVANIA STATE UNIVERSITY BULLETIN (USPS 426-680)

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# UNIVERSITY CALENDAR\*

## SPRING SEMESTER 1986

### JANUARY

- 7 Tuesday — Arrival date
- 8-10 Wednesday to Friday — Orientation and registration
- 13 Monday — Classes begin

### MARCH

- 3-7 Monday to Friday — Spring holiday, no classes

### MAY

- 2 Friday — Classes end
- 3-4 Saturday, Sunday — Study days
- 5-10 Monday to Saturday — Final examinations
- 17-18 Saturday, Sunday — Spring commencement

## SUMMER SESSION 1986

### *Intercession*

#### MAY

- 12 Monday — Classes begin

#### JUNE

- 6 Friday — Classes end

### *Eight-Week Session*

#### JUNE

- 8 Sunday — Arrival date
- 9-10 Monday, Tuesday — Orientation and registration
- 11 Wednesday — Classes begin

#### JULY

- 4 Friday — Independence Day holiday, no classes +

#### AUGUST

- 6 Wednesday — Classes end
- 7-9 Thursday to Saturday — Final examinations
- 16 Saturday — Summer commencement

### *Six-Week Session*

#### JUNE

- 25 Wednesday — Classes begin

#### AUGUST

- 6 Wednesday — Classes end

## FALL SEMESTER 1986

### AUGUST

- 21 Thursday — Arrival date
- 22;25-26 Friday; Monday, Tuesday — Orientation and registration
- 27 Wednesday — Classes begin

### SEPTEMBER

- 1 Monday — Labor Day holiday

### NOVEMBER

- 27-30 Thursday to Sunday — Thanksgiving holiday

### DECEMBER

- 12 Friday — Classes end
- 13-14 Saturday, Sunday — Study days
- 15-20 Monday to Saturday — Final examinations

### JANUARY 1987

- 3 Saturday — Fall commencement

## SPRING SEMESTER 1987

### JANUARY

- 6 Tuesday — Arrival date
- 7-9 Wednesday to Friday — Orientation and registration
- 12 Monday — Classes begin

### MARCH

- 2-6 Monday to Friday — Spring holiday, no classes

### MAY

- 1 Friday — Classes end
- 2-3 Saturday, Sunday — Study days
- 4-9 Monday to Saturday — Final examinations
- 16-17 Saturday, Sunday — Spring commencement

\*This calendar is subject to change without notice. Although the University makes every effort to avoid conflicts with religious holidays in preparing the calendar for an academic year, such conflicts are sometimes unavoidable. When they occur, efforts are made to make special arrangements for the students affected.

+Classes that would have met on Friday, July 4, 1986, will meet on Wednesday, August 6, 1986.



UNIVERSITY CALENDAR

SUMMER SESSION 1987

*Intersession*

MAY  
11 Monday – Classes begin

JUNE  
5 Friday – Classes end

*Eight-Week Session*

JUNE  
7 Sunday – Arrival date  
8-9 Monday, Tuesday –  
Registration  
10 Wednesday – Classes begin

JULY  
3 Friday – Independence Day  
holiday, no classes#

AUGUST  
5 Wednesday – Classes end  
6-8 Thursday to Saturday –  
Final examinations  
15 Saturday – Summer  
commencement

*Six-Week Session*

JUNE  
24 Wednesday – Classes begin

AUGUST  
5 Wednesday – Classes end

FALL SEMESTER 1987

AUGUST  
20 Thursday – Arrival date  
24-25 Monday, Tuesday –  
Registration  
26 Wednesday – Classes begin

SEPTEMBER  
7 Monday – Labor Day  
holiday, no classes\*

NOVEMBER  
26-27 Thursday, Friday –  
Thanksgiving holiday, no  
classes

DECEMBER  
11 Friday – Classes end  
12-13 Saturday, Sunday – Study  
days  
14-19 Monday to Saturday – Final  
examinations

JANUARY  
9 Saturday – Fall  
commencement

#Classes that would have met on Friday, July 3, 1987, will meet on Wednesday, August 5, 1987.

\*Classes that would have met on Monday, September 7, 1987, will meet on Wednesday, December 9, 1987.

**SPRING SEMESTER 1988****JANUARY**

- 5 Tuesday – Arrival date  
 7-8 Thursday, Friday –  
 Registration  
 11 Monday – Classes begin

**FEBRUARY**

29,

Mar. 1-4 Spring holiday, no classes

**APRIL**

- 29 Friday – Classes end  
 30, May 1 Saturday, Sunday – Study  
 days

**MAY**

- 2-7 Monday to Saturday – Final  
 examinations  
 14-15 Saturday, Sunday – Spring  
 commencement

**SUMMER SESSION 1988***Intersession***MAY**

- 9 Monday – Classes begin

**JUNE**

- 3 Friday – Classes end

*Eight-Week Session***JUNE**

- 5 Sunday – Arrival date  
 6-7 Monday, Tuesday –  
 Registration  
 8 Wednesday – Classes begin

**JULY**

- 4 Monday – Independence  
 Day holiday, no classes#

**AUGUST**

- 3 Wednesday – Classes end  
 4-6 Thursday to Saturday –  
 Final examinations  
 13 Saturday – Summer  
 commencement

*Six-Week Session***JUNE**

- 22 Wednesday – Classes begin

**AUGUST**

- 3 Wednesday – Classes end

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#Classes that would have met on Monday, July 4, 1988, will meet on Wednesday, August 3, 1988.

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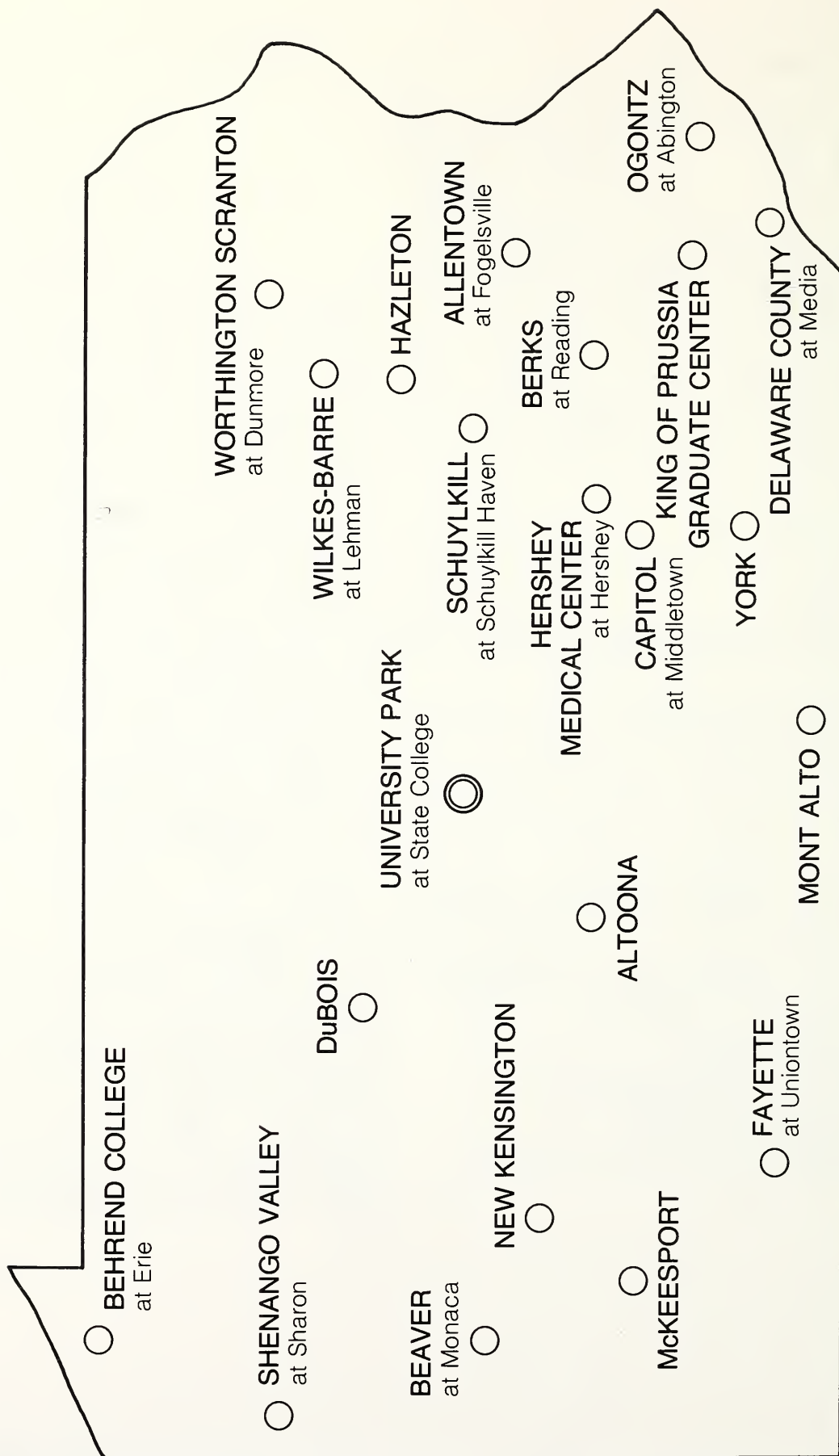
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\*Upper-division and graduate courses

†Graduate courses







# THE UNIVERSITY

## MISSION OF THE UNIVERSITY

Penn State's fundamental responsibility is to provide programs of instruction, research, and public service, and thus act as an instrument of self-renewal and development for the Commonwealth. As Pennsylvania's land-grant university, Penn State must preserve and enhance its distinctive qualities.

While the modern university maintains links to the past and serves to maintain cultural values, its most extensive task at present is to help people to understand the great changes taking place in our society. People must have the skills and the learning habits that will make it possible for them to educate themselves over a lifetime. The rapid rate of change in contemporary society dictates that the University's programs adjust without undue delay to meet the needs of students and society.

University programs of research and other creative and scholarly activities are essential if the University is to contribute to the solution of the social, scientific, and technical problems of society and discharge effectively its upper-division and graduate teaching responsibilities. The University must also serve the Commonwealth directly through its programs of extension, continuing education, and other public service programs designed to meet the needs of citizens throughout the state.

By encouraging the enrollment of students from all segments of society and from other states and nations, the University provides the intellectual arena in which the search for rational solutions to societal problems can be nurtured, and in which teaching and learning can be the pivotal function. In performing this function, it is essential that the University foster independent thought and open discussion of alternatives.

## RESIDENT INSTRUCTION

The undergraduate degree programs of the University provide students with opportunities to increase their knowledge and understanding of the world, and to grow in their individual skills and capabilities for learning, analyzing, judging, creating, and communicating. All undergraduate degree programs and courses offered by the colleges and other degree-granting units of the University are under the academic sponsorship of a faculty committed to scholarship and are implemented under the academic policies and student rules established by the University Faculty Senate. They are intended to be flexible in accommodating students interested in learning, whether through traditional or nontraditional offerings, while enrolled on either a part-time or a full-time basis. The degree programs and courses of the colleges and other degree-granting units are offered through University administrative arrangements identified as Resident Instruction and Continuing Education.

The primary mission of Resident Instruction is to provide credit courses to degree candidates on University campuses as well as to administer certain off-campus credit-granting activities such as internships, practicums, field trips, and foreign studies. Students not formally admitted to degree candidacy (including provisional and nondegree students) may participate in Resident Instruction offerings as time and space permit.

## HISTORY

THE PENNSYLVANIA STATE UNIVERSITY, chartered by the Pennsylvania legislature as the Farmers' High School in 1855, was founded by professional men, educated farmers, and state and county agricultural leaders. A faculty of 4 met the incoming class of 69 students in February 1859.

In May 1862, the institution was renamed the Agriculture College of Pennsylvania, a name which recognized that its work was of collegiate level. Two months later, on July 2, President Abraham Lincoln signed the Morrill Land Grant Act offering each state free public land which it could sell to endow institutions of higher learning where "the leading object shall be, . . . to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to

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promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.”

On April 1, 1863, the state legislature declared that the Morrill Act “is hereby accepted by the State of Pennsylvania with all its provisions and conditions and the faith of the State is hereby pledged to carry the same into effect.” The legislature then designated Penn State as the land-grant college of the Commonwealth.

The College broadened the scope of its instruction, began to admit women students, increase its enrollment, and enlarge its physical plant. Graduate work was offered as early as 1862. In 1874 the College was renamed the Pennsylvania State College.

In 1953 the name was changed again—to The Pennsylvania State University—in formal recognition of what Penn State had long since become, one of the country’s leading universities. Its ten undergraduate colleges and the School of Communications now offer 127 baccalaureate and 27 associate degree majors. The Behrend College, in Erie, offers 19 complete baccalaureate programs. The Capitol Campus, near Harrisburg, offers 20 baccalaureate degree majors. Graduate students may choose from 127 approved fields of study. The College of Medicine, at The Milton S. Hershey Medical Center in Hershey, offers the M.D. degree, the M.S. and Ph.D. in anatomy, biological chemistry, genetics, microbiology, neuroscience, pharmacology, and physiology, the M.S. degree in laboratory animal medicine, and the associate degree in Clinical Health Services.

The original student body of 69 has grown to 62,414, the faculty of 4 to 3,891. Beginning with an educational program which offered 40 courses, Penn State today offers 5,273 undergraduate and 2,991 graduate courses and 182 medical courses. The University, whose prime purpose has always been to serve the people and the interests of the Commonwealth and the nation, is accredited by the Middle States Association and is a member of the Association of American Universities.

## ACADEMIC ORGANIZATION OF THE UNIVERSITY

### COLLEGES AND OTHER DEGREE-GRANTING UNITS

The University has ten colleges that offer undergraduate majors leading to baccalaureate and associate degrees: College of Agriculture, College of Arts and Architecture, College of Business Administration, College of Earth and Mineral Sciences, College of Education, College of Engineering, College of Health, Physical Education, and Recreation, College of Human Development, College of the Liberal Arts, and College of Science. Additional degree-granting units of the University are the School of Communications, the Capitol Campus at Middletown, and the Behrend College at Erie. The Capitol Campus and the Behrend College provide an alternative educational setting in which students may enroll in selected degree programs.

### THE COMMONWEALTH EDUCATIONAL SYSTEM

The Commonwealth Educational System is the administrative organization for the University’s system of Commonwealth Campuses and for the delivery of continuing education programs throughout the Commonwealth. Through the seventeen Commonwealth Campuses and the Continuing Education offices at University Park, the Behrend College, the Capitol Campus, Hershey, King of Prussia, and Williamsport, the Commonwealth Educational System offers a wide array of University courses and programs at locations convenient to virtually all of the population of the Commonwealth.

The Division of Technology of the Commonwealth Educational System, in cooperation with the College of Engineering, is administratively responsible for the fourteen associate degree majors in engineering offered at the Commonwealth Campuses. The division director is respon-



sible for the coordination and leadership among the college, campuses, and local industry and provides a central advocate for the engineering technology programs.

**COMMONWEALTH CAMPUSES**—In addition to the University Park Campus in the municipality of State College, the Behrend College in Erie, and the Capitol Campus in Middletown, full-time instruction is available at seventeen Commonwealth Campuses: Allentown (Fogelsville), Altoona, Beaver (Monaca), Berks (Reading), Delaware County (Media), DuBois, Fayette (Uniontown), Hazleton, McKeesport, Mont Alto, New Kensington, Ogontz (Abington), Schuylkill (Schuylkill Haven), Worthington Scranton (Dunmore), Shenango Valley (Sharon), Wilkes-Barre (Lehman), and York.

## TWO-YEAR ASSOCIATE DEGREE MAJORS

Majors which lead to two-year associate degrees are available at the Behrend College and all seventeen of the University's Commonwealth Campuses except Allentown as listed on page 11 of this bulletin. These majors provide concentrated instruction to prepare graduates for specialized occupational assignments, except for the Letters, Arts, and Sciences major, which provides graduates with a general education and some specialization in their fields of interest. In addition, a major in Clinical Health Services is available at the Hershey Medical Center, and a major in Dietetic Food Systems Management is available primarily through the Department of Independent Learning.

Twenty-nine associate degree majors lead to either the Associate in Arts degree, the Associate in Engineering\* degree, or the Associate in Science degree. The majors leading to these degrees are listed below.

### *Associate in Arts Degree*

Labor Studies  
Letters, Arts, and Sciences  
Sociology

### *Associate in Engineering Degree*

Architectural Engineering Technology  
Biomedical Equipment Technology  
Chemical Engineering Technology  
Electrical Engineering Technology  
Highway Engineering Technology  
Mechanical Engineering Technology  
Metallurgical Engineering Technology  
Microcomputer Engineering Technology  
Mining Technology  
Nuclear Engineering Technology  
Railway Engineering Technology  
Solar and Thermal Technology  
Surveying Technology  
Telecommunications Technology

### *Associate in Science Degree*

Agricultural Business  
Business Administration  
Clinical Health Services  
Community Services  
Computer Science  
Dietetic Food Systems  
Management  
Forest Technology  
Hotel, Restaurant, and  
Institutional Management  
Medical Laboratory Technology  
Physical Therapist Assistance  
Science  
Wildlife Technology

A description of the purposes, objectives, and content of each of the two-year majors is given on succeeding pages.

Most of Penn State's associate degree enrollment at present is concentrated in its engineering technology majors. Engineering technology is that part of the technological field that requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities; it lies in the occupational spectrum between the craftsman

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\*Division of Technology, Commonwealth Educational System.



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and the engineer at the end of the spectrum closer to the engineer. The engineering technology graduate, a specialist in applied rather than theoretical technology, is equipped to translate creative ideas into new machines, products, structures, and processes.

The Commonwealth Campuses and the Behrend College also offer up to two years of work in most of the four-year baccalaureate degree majors offered by the University.

**STATEMENT OF BASIC ACADEMIC ADMISSIONS POLICIES**— Admission to the University credit courses or degree candidacy at The Pennsylvania State University is governed by policies established by the University Faculty Senate. Although specific applications of these policies may vary from year to year, from location to location, and from program to program, all University admissions are governed by the following general policies:

1. As an institution of higher education, The Pennsylvania State University is committed to making post-high school education available to all who possess a high school diploma or its equivalent without restriction as to race, sex, religion, color, ancestry, national origin, ethnic origin, or handicap or age as provided by law.
2. The primary responsibility of the University is to residents of the Commonwealth of Pennsylvania. Consequently, within limits expressed from time to time by the Board of Trustees of the University, preference shall be given to Pennsylvania residents in the various admission processes.
3. In order to meet the variety of goals and objectives of the population, the spectrum of offerings is designed to enable persons with a variety of objectives — both degree and nondegree — to receive higher education. Although access to educational opportunities of the University is open to all, courses offered for credit are available to those holding a high school diploma or its equivalent. Policies governing admission to degree candidacy are established by the University Faculty Senate (with delegation of policies governing admissions to graduate programs to the Graduate Faculty of the University) under a general policy of offering admission to those whose past academic performance indicates a reasonable probability of success.
4. Undergraduate students are admitted to either baccalaureate degree candidacy or associate degree candidacy. To be admitted to degree candidacy, the individual must present an academic performance record which indicates a reasonable probability of his or her success in his or her chosen program. In the case of freshman admission to undergraduate degree candidacy, performance is measured through the high school record and standardized test results. In the case of advanced standing admission, performance is measured either through success in nondegree programs and courses of the University or by success at some other institution of higher education.
5. Within the space available in particular programs and at particular locations, admission shall be offered preferentially to those whose performance record indicates the highest probability of success in the chosen program—with this process continuing until all available spaces are filled. Although exceptions to this policy may be made from time to time (for example, recipients of scholarships with restricting qualifications), these exceptions may be made only for students who meet at least the minimum admission and entrance requirements.
6. If a college or other degree-granting unit requires restrictions on its baccalaureate admissions, the priorities or quotas established must include provisions to consider qualified students in each of these groups:

Admissions Group I—Freshman Admissions: Students who hold a high school diploma or equivalent, who present fewer than 18 credits of baccalaureate work (from The Pennsylvania State University or another accredited institution), who meet minimum college or other degree-granting unit entrance requirements, and who meet minimum college or other degree-granting unit admission standards are considered in this group.

Admissions Group II—Penn State Advanced Standing Admissions: Students who (1) request baccalaureate degree readmission, presenting 18 or more credits; (2) request a change

from The Pennsylvania State University associate degree to baccalaureate degree status, presenting 18 or more applicable credits (including Type II, The Pennsylvania State University associate degree graduates); or (3) request a change from The Pennsylvania State University provisional degree to baccalaureate degree status, presenting 18 or more applicable credits, are considered in this group. In all Penn State advanced standing admissions, it is understood that the student must have a G.P.A. of at least 2.00 as computed at Penn State and meet the minimum entrance and advanced standing requirements of the college or other degree-granting unit.

**Admissions Group III—Other Advanced Standing Admissions:** Students who (1) request changes from The Pennsylvania State University nondegree to baccalaureate degree status, presenting 18 or more applicable credits; or (2) have not been students at Penn State and request baccalaureate degree status at Penn State, presenting 18 or more applicable credits. In all advanced standing admissions it is understood that the student must have a G.P.A. of 2.00 as computed at Penn State and meet the minimum entrance and advanced standing requirements of the college or other degree-granting unit.

Within these three groups, no special consideration will be given to any group; students will be admitted to the college or other degree-granting unit on the basis of academic competition (e.g., SAT scores, grade-point averages, grades in required courses in the college or other degree-granting unit, and other evidence predictive of baccalaureate degree performance where available, valid, and reliable).

7. To assure a proper educational mix of students and to further broaden the educational opportunities offered by the University, the University Faculty Senate and the University administration may from time to time authorize various specialized programs. These programs may permit students who do not meet the basic qualifications for admission to degree candidacy to be admitted to such candidacy. These programs may also permit, in selected situations, exceptional students who have not earned a high school diploma or its equivalent to enroll in University credit courses. Such specialized programs may include up to 10 percent of the total admission group for the University in any one year and up to a maximum of 15 percent of the admission to any geographic location of the University.
8. Within this general policy, colleges and other degree-granting units of the University, with the concurrence of the University Faculty Senate, may impose certain educational background requirements (Carnegie Units) which must be completed by an individual before being admitted to degree candidacy.

**ADMISSION REQUIREMENTS—*Freshman Admission***—A person who holds a high school diploma or its equivalent and who has not taken credit courses at an institution of higher learning, or a person who holds a high school diploma or its equivalent and who has taken less than 18 semester credits at an accredited college or university, may be considered for admission as a freshman.

Applicants for admission to all associate degree programs must submit scores of the Scholastic Aptitude Test of the College Entrance Examination Board.

All applications should be addressed to the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802. Telephone: (814) 865-5471.

The University reserves the right to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue higher education.

An applicant must state in writing whether he or she has attended any other institution of higher learning, even though advanced standing is not desired. Failure to indicate, at the time of registration, previous registration in another institution invalidates the admission.

To be admitted to degree candidacy, the applicant must have completed certain educational background requirements, called Carnegie Units or secondary school units. To determine whether you have the appropriate secondary school units required for your choice of a program of study, refer to page 21 to the program of your choice. Then read across to determine the necessary units.

***Admission with Advanced Standing***—An applicant who has attempted at least 18 semester credits at an accredited college or university and has a minimum cumulative grade-point average of at



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least 2.00 (on a 4.00 scale as computed at Penn State) for all graded courses at all colleges and universities previously attended may be considered for admission with advanced standing.

In all cases where work has been taken at other institutions, an official transcript from each place of attendance must be submitted directly to the Undergraduate Admissions Office by the institutions attended. The latter must include evidence that the student was honorably dismissed and was in good academic standing at the time of leaving.

Advanced standing credits may be awarded for work taken at fully accredited institutions provided the grade earned is equivalent to a grade of A, B, or C at this university, and the credits are useful to the student's program of study. In certain circumstances, the University may need to restrict advanced standing admissions in particular programs because of space limitations.

Associate degree programs have a limit on the number of credits that may be accepted by transfer from accredited institutions. Information on credit limitations may be obtained from the academic official responsible for a particular program.

Credits are transferred, but grades and grade points are not. Advanced standing students enter the University without an average, and their average begins with the completion of their first semester of study at Penn State.

*Provisional Student (Degree-Seeking)*—An applicant seeking to pursue a degree program and holding a high school diploma or its equivalent but without the criteria required for admission as a degree candidate may enroll in credit courses at the University. A provisional student may enroll in credit courses if the following criteria are met:

1. The student is making satisfactory progress toward admission as a degree candidate. Progress is satisfactory if a student has earned 18 credits with a minimum grade-point average of 2.00 (on a 4.00 scale). If a student attempted 18 credits and earned less than 2.00, the student is given a warning. A student who has attempted 27 credits with a grade-point average of less than 2.00 will not be permitted to enroll as a provisional student in any subsequent semester. No student, regardless of cumulative grade-point average, who has completed 36 credits will be permitted to enroll as a provisional student in any subsequent semester.
2. There is space available after degree candidates have been accommodated.
3. The student has not been dropped for unsatisfactory scholarship from any college or university previously attended.
4. The student has not been dismissed or suspended for nonacademic reasons from any college or university. An applicant not in good standing at another accredited college or university for disciplinary reasons may petition for an exception to the policy.

A provisional student may apply to become an associate degree candidate after completing 9 credits of Penn State course work with a minimum grade-point average of 2.00. All these credits must be earned at this university. The applicant must also satisfy the entrance requirements of either the major in which enrollment is desired or of the Division of Undergraduate Studies if the student wishes to enroll in that division. An applicant who has completed at least the equivalent to one year's associate degree work before applying for admission as an associate degree candidate must have the approval of either the dean of the college or other degree-granting unit in which enrollment is desired or of the director of the Division of Undergraduate Studies if the student wishes to enroll in that division. After a student is admitted as a degree candidate, the dean of the college or other degree-granting unit of enrollment decides which credits earned as a provisional student may be used to fulfill the degree requirements.

*Nondegree Student*—Any person having received a high school diploma or its equivalent may be permitted to enroll in credit courses (either for credit or audit) at the University. Some of these persons will be classified as nondegree students.

A nondegree student who has not been dropped from degree or provisional status by this university or any other college or university for unsatisfactory scholarship will be listed as a nondegree-regular student and may enroll in any number of credits not to exceed the typical credit load of a full-time student per semester if criteria 1, 2, and 3 are met.

A nondegree student who has been dropped from degree or provisional status by this university or any other college or university because of unsatisfactory scholarship will be listed as a

nondegree-conditional student and may enroll in a maximum of 9 credits per semester if criteria 1, 2, 3, and 4 are met.

1. The student has completed the prerequisites for the courses to be scheduled or has obtained permission from the instructor to schedule the course.
2. There is space available after degree candidates and provisional students have been accommodated.
3. The student has not been dismissed or suspended for nonacademic reasons from any college or university.
4. The student has obtained academic advising/counseling from an adviser/counselor designated by the academic unit to which admission, or reinstatement and readmission, is desired.

Note: A student must be admitted, or reinstated and readmitted, as a degree candidate to apply the credits earned as a nondegree student toward fulfilling the requirements for a degree. The dean of the college or other degree-granting unit of enrollment shall decide which credits may be used to fulfill the degree requirements.

An individual desiring to take associate degree courses as a provisional student (degree-seeking) or nondegree student should submit the appropriate application for admission. An application can be obtained from the Undergraduate Admissions Office, 201 Shields Building, Box 3000, University Park, PA 16802, or from the admissions officer at any Commonwealth Campus or the Behrend College of The Pennsylvania State University.

**PROGRAMS FOR NEW STUDENTS** – The Office of Programs for New Students works to assure that freshmen at all Penn State campuses, as well as advanced standing and change of assignment students at University Park, are provided with a comprehensive introduction to the essential academic and student development opportunities of the campus and the university in general beginning with a new student's acceptance to a campus and continuing through completion of the new student's first semester.

Through the programs of this office, offered in cooperation with the colleges' academic units and various student service operations, new students are introduced to the intellectual and scholarly expectations of the University, to the skills needed for advanced study and lifelong learning, and to the student development opportunities with academic merit. In addition, this office provides a series of publications designed to introduce the University, to inform students of the required procedures for matriculation, and to offer a perspective on college life. These publications also give new students practical information about important dates, times, and locations (e.g., arrival day, first day of classes, course drop/add, etc.).

Many programs for new students are scheduled during arrival week each semester. During this period, new students receive instruction and counseling concerning their courses of study and participate in extracurricular and cultural activities. Registration is also held during arrival week.

**BASIC SKILLS** – All students entering the freshman class in an associate degree program are tested for basic skills in English composition, reading, and mathematics.

Students identified with major weaknesses in English composition are required to enroll in English 4 (3 credits) prior to scheduling English 15. Students with reading and/or mathematics weaknesses are encouraged to strengthen these skills through other available University resources.

Students are encouraged through the Basic Skills Program to overcome possible difficulties early in their college careers to ensure greater success with their academic studies.

**DIVISION OF UNDERGRADUATE STUDIES**—This division is an academic unit of the University which offers at the Commonwealth Campuses, the Behrend College, and the University Park Campus the following programs and services:



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*Freshman Testing, Counseling, and Advising Program*—All new freshmen admitted to the University are provided comprehensive testing, counseling, and academic advising prior to attending first-semester classes. The purpose of the program is to provide all new students with assistance in evaluating their educational plans and objectives.

*Enrollment*—New freshmen who prefer to test their abilities and interests or who wish to explore several areas of study before identifying themselves with one of the University's colleges or other degree-granting units can request to begin their studies in the Division of Undergraduate Studies. At any time in their academic careers, students whose interests or career objectives change can request that they be enrolled in 2-DUS (Division of Undergraduate Studies). Specialized academic advising in DUS accompanies students' attendance in regular courses until students choose a new program and meet its academic standards for transfer.

*Advising and Counseling*—All students, whether or not they are enrolled in the Division of Undergraduate Studies, have available to them the professional advising, counseling, and referral services provided by the division. Such services are a supplement to and are coordinated with the advisory services of the colleges and faculty. Provisional students aspiring for degree programs are also served by this unit.

*Undergraduate Academic Information*—The Division of Undergraduate Studies provides a comprehensive academic information support system throughout the University to assist faculty in their student advisory responsibilities. DUS academic information centers are located at every Commonwealth Campus and in the colleges and other degree-granting units at University Park.

**GRADING SYSTEM**—The grades of A, B, C, D, and F indicate the following qualities of academic performance:

- A (EXCELLENT) Indicates exceptional achievement.
- B (GOOD) Indicates extensive achievement.
- C (SATISFACTORY) Indicates acceptable achievement.
- D (POOR) Indicates only minimal achievement. It indicates that the student may be seriously handicapped in carrying a more advanced course for which this course is a specific prerequisite.
- F (FAILURE) Indicates inadequate achievement necessitating a repetition of the course in order to secure credit.

The grades of A, B, C, D, and F are assigned the following grade-point equivalents:

<i>Grade</i>	<i>Grade-Point Equivalent</i>
A	4.00
B	3.00
C	2.00
D	1.00
F	0

Grade points are determined by multiplying the grade-point equivalent of the grade earned by the number of credits for the subject; e.g., ENGL 015, 3 credits, with a grade of A (grade-point equivalent 4.00) yields 12 grade points.

**GRADUATION REQUIREMENTS**—In order to graduate, a student must complete the course requirements of the major and earn at least a C average (a grade-point average of 2.00) for all courses.

**DEGREES**—The associate degree majors outlined in this bulletin lead to the following degrees: Associate in Arts, Associate in Engineering, and Associate in Science.

## SECONDARY SCHOOL UNITS REQUIRED FOR ADMISSION CONSIDERATION TO ASSOCIATE DEGREE PROGRAMS

	English	Math. (A)*	Math. (B) +	Math. (C)**	Science	Other Subjects	Total
Agricultural Business	3					12	15
Architectural Engineering Technology	3	2				10	15
Biomedical Equipment Technology	3	2				10	15
Business Administration (2-year)	3		2			10	15
Chemical Engineering Technology	3	2				10	15
Clinical Health Services	3			2	2 + +	8	15
Community Services	3					12	15
Computer Science	3	2				10	15
Dietetic Food Systems Management	3					12	15
Electrical Engineering Technology	3	2				10	15
Forest Technology	3		2			10	15
Highway Engineering Technology	3	2				10	15
Hotel, Restaurant, and Institutional Management	3					12	15
Labor Studies	3					12	15
Letters, Arts, and Sciences	3					12	15
Mechanical Engineering Technology	3	2				10	15
Medical Laboratory Technology	3	2			2 + +	8	15
Metallurgical Engineering Technology	3	2				10	15
Microcomputer Engineering Technology	3	2				10	15
Mining Technology	3	2				10	15
Nuclear Engineering Technology	3	2				10	15
Physical Therapist Assistance	3		1 ‡		1 #	10	15
Railway Engineering Technology	3	2				10	15
Science (2-year)	3	2				10	15
Sociology (2-year)	3					12	15
Solar and Thermal Technology	3	2				10	15
Surveying Technology	3	2				10	15
Telecommunications Technology	3	2				10	15
Wildlife Technology	3		2			10	15

\*Math. (A) requirements may be satisfied by at least 2 units of mathematics: 1 unit of algebra and 1 additional unit in any combination of advanced algebra, plane geometry, solid geometry, or trigonometry.

+Math. (B) requirements may be satisfied by any 2 units of mathematics, but it is strongly recommended that the 2 units be 1 of algebra and 1 of plane geometry.

\*\*Math. (C) requirements may be satisfied by 1 unit of algebra and 1 additional unit in mathematics.

+ +Biology and chemistry are recommended.

‡The one unit of mathematics should be in algebra. It is strongly recommended that one additional unit of mathematics be completed.

#The one unit of science should be in biology. It is strongly recommended that one additional unit of science be completed.

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**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE UNIVERSITY PARK CAMPUS** – Credits received for 800-series courses may be applicable to a particular baccalaureate degree program listed in the current baccalaureate degree bulletin of The Pennsylvania State University at the discretion of the appropriate college and major department.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE CAPITOL CAMPUS** – In addition to receiving an education to prepare for employment, the graduate of an associate degree program may also qualify for admission to various programs leading to a baccalaureate degree from Penn State's Capitol Campus. Those anticipating admission to the Capitol Campus should inquire at the Capitol Campus Admissions Office late in their freshman year or early in their sophomore year concerning baccalaureate degree course requirements.

Graduates from associate degree programs in Agricultural Business, Business Administration, Computer Science, or Dietetic Food Systems Management may want to consider further study at the Capitol Campus in a Business Administration baccalaureate degree program.

Graduates of the associate degree majors in Architectural Engineering Technology, Biomedical Equipment Technology, Chemical Engineering Technology, Electrical Engineering Technology, Highway Engineering Technology, Mechanical Engineering Technology, Metallurgical Engineering Technology, Mining Technology, Nuclear Engineering Technology, Railway Engineering Technology, Solar and Thermal Technology, Surveying Technology, and Telecommunications Technology may want to consider continuing at the Capitol Campus in an engineering technology major leading to a Bachelor of Science degree in Engineering Technology. Majors are offered in Electrical Engineering Technology, Energy Technology, Mechanical Engineering Technology, Structural Design and Construction Engineering Technology, and Water Resources Engineering Technology.

Associate degrees in the following majors are also acceptable toward admission to baccalaureate degree majors at the Capitol Campus: Community Services; Forest Technology; Hotel, Restaurant, and Institutional Management; Labor Studies; Letters, Arts, and Sciences; Medical Laboratory Technology; and Sociology.

Graduates of the associate degree majors in Science and in Computer Science may want to apply for admission to the baccalaureate degree major in Mathematical Sciences at the Capitol Campus.

**APPLICATION OF ASSOCIATE DEGREE CREDITS TOWARD A BACCALAUREATE DEGREE AT THE BEHREND COLLEGE** – Graduates of associate degree majors may also qualify for admission to a variety of baccalaureate degree majors at the Behrend College of The Pennsylvania State University. Students interested in applying to Behrend should contact the Admissions Office at Behrend or talk with the Behrend's dean representative at their campus.

Graduates of associate degree majors in either Business Administration or Computer Science may want to continue study in one of the following baccalaureate degree majors at Behrend: Accounting, Business Economics, General Business, Management, or Management Information Systems. Students graduating with a two-year degree in Letters, Arts, and Sciences may want to consider any of a large number of majors offered by Behrend in the liberal arts, sciences, and business.

Graduates of associate degree majors in Biomedical Equipment Technology, Electrical Engineering Technology, Microcomputer Engineering Technology, and Telecommunications Technology may want to continue their education in the Instrumentation and Controls option of Behrend's baccalaureate degree major in Energy and Environmental Technology. Students receiving an Associate in Engineering degree in Mechanical Engineering Technology may want to continue study in the Mechanical Design and Materials option of the baccalaureate degree major in Energy and Environmental Technology offered at Behrend.



# STUDENT WELFARE

**STUDENT GOVERNMENT**—Representative student leadership is provided on each campus of the University by a student government association which functions through officers and representatives elected from and by the student body. In addition to their involvement in student programs at their local campuses, student officers and delegates from University campuses convene several times annually. These meetings provide for an exchange of information among the various student government associations and for system-wide coordination in student government and student activities.

**STUDENT CONDUCT**—The Code of Conduct prohibits acts that interfere with the basic purposes or processes of the University, or with the rights, health, and safety of its members. Such acts include, but are not limited to, academic dishonesty, unethical and destructive behavior, and violation of rules and regulations. Violations of the code are subject to disciplinary action that may include separation from the University.

**INSURANCE PROTECTION WHILE ATTENDING THE UNIVERSITY**—Any student who wants insurance protection while in attendance at the University (1) for accident and health and/or (2) for loss of property by fire or theft should arrange personally for whatever insurance seems desirable through an agency of his or her choice. Accident and health programs are available through the University Health Service.

**HEALTH SERVICES**—The University Health Service assists in promoting and maintaining the health of students.

Prior to their initial registration, all new full-time students entering the University must submit a medical history on a special form provided by the University. The completed form constitutes a vital part of the student's medical record.

The health services of the University are made available to students in accordance with a statement provided by each campus, pertinent to that campus, and published in its student handbook.

The University does not obligate itself for payment of medical services other than those provided by personnel employed or retained by the University and in facilities owned or contracted for by the University. Treatment provided in contract facilities must be authorized by the campus executive officer, the director of student programs and services, or the nurse.

Students are urged to protect themselves against medical expenses that may result from injury or illness by arranging for personal insurance coverage. An accident and sickness plan is available to all undergraduate students at a reasonable charge through the University Health Service.

**DISABLED STUDENT SERVICES**—The Pennsylvania State University encourages academically qualified disabled students to take advantage of its educational programs. It is the policy of the University not to discriminate against persons with disabilities in its admissions policies or procedures or its educational programs, services, and activities.

The University is responsible for making all of its programs and services available to all its students. In cases where it is necessary to provide auxiliary services and programs to meet the specific needs of disabled students, it is the responsibility of the coordinator of the Office for Disability Services to make reasonable accommodations. Examples of such accommodations available to those with special needs are sign language interpreters, accessible University transportation, and classroom and library assistance. Students anticipating the need for special services, both before and after enrollment, are encouraged to contact the coordinator of the Office for Disability Services at University Park (105 Boucke Building) or the director of student programs and services at other campuses.



## GENERAL INFORMATION

**CAREER DEVELOPMENT AND PLACEMENT**—The Career Development and Placement Center assists students in continual evaluation of their educational and career plans as they progress through college and helps them identify sources of personal or academic difficulty which may interfere with their progress. Individual as well as group educational and career counseling programs are available to students. A computerized guidance system also is available for student use at each campus location.

A student programs and services staff member at each campus is responsible for providing placement assistance for associate degree graduates. Services include inviting employers to the campus to interview graduates for permanent employment, providing job information, and assisting students in preparing for job interviews. The Career Development and Placement Center at the University Park Campus supplies prospective employers (national, state, and local) with information concerning the associate degree programs and works cooperatively with the Commonwealth Campuses in assisting graduates to locate suitable employment.

## STUDENT AID

In addition to the student aid information provided below, students may want to consult the admissions booklet "It Takes Two" sent to all applicants and the "Penn State Student Financial Aid" brochure available upon request. Additional questions should be directed to the Office of Student Aid, 335 Boucke Building on the University Park Campus, or to the Office of Student Programs and Services at a Commonwealth Campus.

### AID PROGRAMS AVAILABLE TO ASSOCIATE DEGREE CANDIDATES

#### GRANTS (aid sources not requiring repayment)

*Pell Grant* (formerly Basic Educational Opportunity Grant)—The Pell Grant is the major federal grant program available to undergraduates. This award is available to undergraduates pursuing their first baccalaureate or associate degree on at least a half-time basis (6 credits per semester).

*Pennsylvania Higher Education Assistance Agency Grant (PHEAA)*—This is a grant established by the Commonwealth to assist undergraduates who have a financial need as defined by PHEAA guidelines. Applicants must be residents of Pennsylvania and enrolled full-time.

Note: Non-Pennsylvania students should contact their state higher education assistance agencies for information on state grants available for attending Penn State. Names and addresses of higher education assistance agencies are available from the Office of Student Aid, 335 Boucke Building, or the Office of Student Programs and Services at Commonwealth Campuses.

*Supplemental Educational Opportunity Grant (SEOG)*—This grant is available to undergraduates with high documented financial need. It is normally awarded in combination with the College Work Study Program or the National Direct Student Loan.

*Penn State Academic Grant*—This grant is awarded to students demonstrating academic excellence and high financial need. Students completing the application process for campus-based aid (NDSL, SEOG, CWSP) will be automatically considered for this grant.

#### LOANS

*Guaranteed Student Loan Program (GSL)*—The GSL is a federally subsidized loan program, available through banks, savings and loan associations, and other private lenders, which offers students attending on at least a half-time basis the opportunity to borrow money for their educa-

tion. An undergraduate may borrow up to \$2,500 per year with a maximum of \$12,500 for undergraduate studies. All students must file a needs test form with the GSL application to determine loan eligibility. Needs test forms are available from lending institutions with loan applications or from the Office of Student Aid at University Park or the Office of Student Programs and Services at Commonwealth Campuses. Students from families with an adjusted gross income greater than \$30,000 are eligible for GSL assistance based on documented financial need. Repayment begins six months after the termination of the student's education at an interest rate of 8 percent per year simple interest.

*PLUS Loan*—This is an educational loan available to parents of dependent undergraduate students. It is also available to independent undergraduates and to graduate students. Similar to the GSL program, funds are provided by private lenders such as hometown banks, etc. The interest rate is 12 percent. Repayment of the loan begins within sixty days. Student borrowers may defer repayment of principal until six months after termination of studies.

*PHEAA Higher Education Loan Plan (HELP)*—This plan may involve one or more loan programs. It combines the PHEAA Family Partnership Loans and the new PHEAA Supplemental Loans with the federally subsidized student loan programs. Families can borrow the amount needed at the lowest cost. One application provides consideration for several programs. Families may borrow up to \$10,000 per year. Interest rates range between 8 and 12 percent annually, depending on the loan package selected. Applications are available from the Office of Student Aid or may be forwarded directly from the PHEAA Agency.

*National Direct Student Loan (NDSL)*—This program provides loans of up to \$1,500 per year with an overall maximum of \$6,000 for undergraduate students with documented financial need. Repayment starts six months after termination of the student's education at an interest rate of 5 percent per year simple interest. Postponement of repayment and loan cancellation may be arranged for certain types of employment following graduation.

*University Loans*—University loans are funds established by donors to help students who have a documented financial need. These loans help needy students meet the educational and living expenses required to attain a college degree. Repayment starts immediately after the student completes his or her studies at a simple interest rate of 6 percent per year. Simple interest accrues at 6 percent during the in-school period and any subsequent deferment period.

## EMPLOYMENT

*College Work Study Program (CWSP)*—The CWSP is a form of federal aid which allows a student to earn a portion of the documented financial need through approved CWSP jobs. This is a nonrepayable source of aid since the student is paid an hourly wage for his or her employment.

*Student Employment*—Students who are interested in part-time employment on campus or in the State College area should contact the Student Employment Office, 335 Boucke Building, University Park, PA 16802, or contact the director of student programs and services at Commonwealth Campuses. Earnings from University employment must, according to federal regulations, be considered an aid resource which will be counted toward meeting a student's financial need.

## SCHOLARSHIPS

*University Scholarships*—University scholarships are awarded on the basis of superior high school or college academic performance and, in most cases, documented financial need. They are awarded either by the scholarship committees in the various academic colleges of Penn State, by the Freshman or Faculty Senate Scholarship Committee, or by the Commonwealth Campus Scholarship Committees.

## GENERAL INFORMATION

### HOW TO APPLY

After completing the application for admission to the University, each student seeking aid consideration should complete the forms necessary for each aid program being sought.

#### I. Aid Awarded by the Federal Government

##### Pell Grant

(All undergraduate students)

Students who have completed the application for Pennsylvania State Grant and Federal Student Aid or the Financial Aid Form (FAF) are considered for the Pell Grant program. After receiving the Student Aid Report (SAR), which designates eligibility for a Pell Grant, follow the instructions contained on the SAR to finalize the award. Applications are available from high school guidance counselors, the Office of Student Aid, or the director of student programs and services at Commonwealth Campuses. They should be completed as soon after January 1 as possible. Transfer students must request a Financial Aid Transcript to be sent to the Office of Student Aid, 335 Boucke Building, University Park, PA 16802, from each institution previously attended whether or not aid was received.

#### II. Aid Awarded/Coordinated by the States

##### PHEAA Grant (Pennsylvania residents only)

Other state grant/scholarship programs

Guaranteed Student Loan

PLUS Loan

PHEAA HELP (Higher Education Loan Plan)

(Undergraduates)

Pennsylvania residents should complete the application for Pennsylvania State Grant and Federal Student Aid. Students currently receiving PHEAA grants will receive renewal applications by mail from the PHEAA agency. Regular applications are available from high school guidance counselors, the Office of Student Aid, and the director of student programs and services at Commonwealth Campuses, in addition to the Pennsylvania Higher Education Assistance Agency. Applications should be completed as soon after January 1 as possible. Non-Pennsylvania students should contact their state's Higher Education Agency for information on aid programs available to them as Penn State students.

(PA and non-PA residents)

Contact a local bank or lending institution for application forms for the Guaranteed Student Loan Program and the PLUS Loan. Applications for PHEAA HELP are available by contacting PHEAA directly or from the Office of Student Aid. After completing the forms, submit them to the Office of Student Aid, 335 Boucke Building, University Park, PA 16802, along with a stamped envelope addressed to the lender. Students should allow six to eight weeks for the processing of their loan application.

#### III. Aid Awarded by The Pennsylvania State University

Supplemental Educational Opportunity Grant (SEOG)

National Direct Student Loan (NDSL)

College Work Study Program (CWSP)

University loans and scholarships

(All students)

Complete the application for Pennsylvania State Grant and Federal Aid or the Financial Aid Form (FAF).

Note: Freshman students need only to complete one of the above forms to be considered for aid awarded by Penn State. Both forms are available from high school guidance counselors, the Office of Student Aid, or the director of student programs and services at Commonwealth Campuses. The recommended filing date for consideration for aid is Feb-



ruary 15; however, students are encouraged to submit applications as soon after January 1 as possible.

(All students except entering freshmen)

Complete the Office of Student Aid's Financial Aid Application. Students may indicate on this application the type of aid they are seeking, with the exception of University scholarships. File by April 1. The application is available from the Office of Student Aid or the director of student programs and services at Commonwealth Campuses.

(All students except entering freshmen)

Complete the University Scholarship Application. Since funds are limited, applications are only encouraged from those students with a cumulative grade-point average of 3.00 or higher. File by March 1. This application is available from the Office of Student Aid or the director of student programs and services at Commonwealth Campuses.

(Transfer students only)

Complete a Financial Aid Transcript. It is necessary for the University to know if you received aid at any other institution prior to enrolling at Penn State. Request this form from the Office of Student Aid. A Financial Aid Transcript must be submitted from all schools previously attended whether or not aid was received.

IV. Private Aid Sources

All students are urged to explore local scholarship/grant opportunities as well as any private low-interest loan funds offered by local employers and civic organizations.

HOW MUCH DOES IT COST TO ATTEND PENN STATE?

One of the major concerns of students and their parents is knowing how much it will cost to attend Penn State for an academic year. The following itemized listing of expenses, although prepared for the 1985-86 academic year, may be used as a basic guide for your planning. Students may find that some of the costs vary according to individual needs and circumstances.

STUDENT BUDGET – 1985-86

	<i>Residence Halls or Off-Campus Housing (All Campuses)</i>	<i>Living at Home</i>
Commonwealth Campus Tuition	\$2,494.00*	\$2,494.00*
Room & Board	2,750.00	1,100.00
Books & Supplies	360.00	360.00
Clothing & Laundry, Transportation, Personal Maintenance, Medical, & Recreation	1,950.00	2,450.00
Total*	<u>\$7,554.00</u>	<u>\$6,404.00</u>

\*For non-Pennsylvania residents the nonresident undergraduate tuition figure of \$5,544.00 should be substituted. The total estimated budget for an out-of-state undergraduate student at University Park Campus or a Commonwealth Campus is \$10,604.00.

The 1985-86 tuition at the University Park Campus, the Capitol Campus, and the Behrend College is \$2,760.00.



## GENERAL INFORMATION

### STUDENT AID POLICIES

The Office of Student Aid at Penn State administers and coordinates the aid programs according to applicable federal and state regulations and University policies which guarantee each student equal access to financial assistance. The Office of Student Aid employs the standard need analysis services of the College Scholarship Service and the Pennsylvania Higher Education Assistance Agency to assess the aid eligibility of student applicants, ensuring equity of treatment among all applicants. The University does not discriminate on the basis of race, creed, color, national origin, handicap, age, or sex in any of its policies, practices, or procedures.

Eligibility for aid is contingent upon the student's financial need for assistance to meet educational costs. Each program has specific eligibility requirements which must be met before funds are awarded. In addition to financial need as a criterion for receiving aid, a student must be enrolling as a degree or provisional student. Nondegree students are not eligible to receive aid at Penn State. The University may require an official copy of the Federal Income Tax Form 1040 to verify eligibility for aid.

The Office of Student Aid assumes that all aid applicants will keep apprised of all application deadlines pertaining to the aid sources they are seeking. Because limited funds are available, applications filed after the applicable deadline dates are considered only as funds permit. On-time applicants receive first consideration. Some aid programs have flexible application deadlines which permit students to receive consideration at most times during the year (for example, the GSL and Pell Grant programs). Current and prospective aid recipients are strongly encouraged to keep well informed of aid application procedures through aid publications, news media, and agencies providing aid information such as the Office of Student Aid at University Park and the Office of Student Programs and Services at Commonwealth Campuses.

Aid is never automatically awarded for subsequent years. Students must reapply each year for funds. Students who plan to attend the summer session must file separate applications to be considered for almost all aid programs. The major exceptions to this requirement are as follows:

1. Entering freshmen seeking aid awarded by the University (see "How to Apply" above) must file only the application for Pennsylvania State Grant and Federal Student Aid or the FAF to receive consideration for the summer session if they have been admitted to the University specifically to begin during the summer session; and
2. The Pell Grant program has no separate summer application and is generally awarded to students during the fall-spring academic year. (Pell Grant recipients not attending the entire fall-spring year should contact the Office of Student Aid to determine if a summer payment is possible.)

One of the goals of the Office of Student Aid is to help financial aid recipients receive a financial aid package which will attempt to meet the student's documented financial need. The financial aid package can be composed of federal aid, state grant monies, private award sources, or any other source of funds available to the student, including earnings from University employment.

It is the responsibility of the Office of Student Aid, however, to assure the federal government that federal aid recipients will not be permitted to retain financial aid *exceeding* the students' need. Students should be aware that if the aid received is in excess of need, they will be notified of their responsibility to return the excess amount to the University.

### FEDERAL STUDENT ASSISTANCE SATISFACTORY ACADEMIC PROGRESS STANDARD

Satisfactory academic progress must be maintained for continued consideration for federal financial assistance at Penn State. Students must comply with the following to insure continued consideration:

1. Minimum standards for satisfactory scholarship established by Senate Policy Section 54-54 of the *Academic Policies and Procedures for Undergraduate Students* published in the *Policies and Rules for Students*.
2. Associate degree candidates must complete a minimum of 26 credits per academic level.

3. Students falling below this minimum by no more than 10 credits will be granted one probationary period (two semesters) to attain the minimum earned credit requirement while retaining aid eligibility.
4. When a student falls below this probationary level, the student becomes ineligible for aid.
5. While ineligible, federal aid is denied until the appropriate credit expectation has been reached for the next academic year.
6. Complete the requirements for the associate degree within six semesters.

Exceptions to the above and information concerning reinstatement of aid, course audits, deferred grades, and course repeats can be obtained by contacting the Office of Student Aid, 335 Boucke Building. Copies of the Federal Student Assistance Satisfactory Academic Progress Standard are available from the Office of Student Aid at University Park or the Campus Office of Student Programs and Services at the Commonwealth Campuses.

#### SELECTIVE SERVICE REGISTRATION COMPLIANCE

Educational institutions are now required by law to collect a Statement of Registration Compliance from every federal financial aid recipient whether male or female. This attests to their status with the Selective Service. Disbursement of federal financial aid funds cannot occur until the Statement of Registration Compliance is on file with the Office of Student Aid. This requirement applies to NDSL, SEOG, CWSP, Pell, GSL, and PLUS programs.

# ESTIMATED TUITION, ROOM, BOARD, AND OTHER CHARGES

NOTE: *The University reserves the right to revise tuition, room, board, and other charges without further notice. Tuition and charges for baccalaureate and graduate programs are listed separately in the Baccalaureate Degree Programs, Graduate Degree Programs, and Capitol Campus bulletins. Penn State has two semesters and a summer session. Students normally attend two semesters per year. The tuition and charges set forth below are for the 1985-86 academic year. The actual tuition and charges for the 1986-87 and 1987-88 academic years will be established prior to the beginning of the fall semester of each academic year.*

**TUITION**—Tuition per semester for associate degree students in 1985-86:

	<i>Pennsylvanians</i>	<i>Non-Pennsylvanians</i>
12 or more credits:		
University Park Campus	\$1,380.00	\$2,772.00
Commonwealth Campuses	1,247.00	2,772.00
Behrend College	1,380.00	2,772.00
11 or fewer credits:		
University Park Campus—rate per credit	115.00	231.00
Commonwealth Campuses—rate per credit	95.00	231.00
Behrend College—rate per credit	107.00	231.00

**Enrollment Charge**—All entering students who plan to enroll for 12 or more credits are required to pay a nonrefundable enrollment charge of \$52 upon acceptance of an offer of admission.

**General Deposit**—Undergraduate students are required to make a general deposit of \$50 at the time of admission. This deposit will serve to safeguard the property and equipment used by students in their course of study. It will be retained until a student withdraws or is graduated.

The deposit, less any charges for equipment damages, losses, and forfeitures, will be refunded early in the subsequent semester to the student who has withdrawn or been graduated. The refund will be made by check and mailed to the student's home address. If at any time the balance of the deposit falls below the minimum amount of \$15, the deposit must be replenished.

**Credit by Examination**—A charge of \$30 per credit is made for credit by examination. For evaluation of credits completed elsewhere a charge of \$25 is made for those applying for admission and a charge of \$3 for those who are already matriculated.

**Student Activities**—Student activities charges are determined by elected representatives of the student body, together with a faculty representative.

**Certification and Verification Fee**—A charge of \$2 is made for each request for verification or certification of enrollment.

**Change of Schedule Charge**—Unless a change is necessitated by the University, a charge of \$6 is made for each change of schedule after the first five working days of a semester.

**Late Registration Charge**—Unless the delay is unavoidable, \$10 is charged a student who fails to register on the appointed day.

**Other Expenses**—Books and supplies must be secured by the student. These vary from approximately \$125 per semester, depending upon the program.

**TERMS OF PAYMENT**—Tuition and charges, including room and board, are due and payable in advance of each semester at the Office of the Bursar, 103 Shields Building, University Park, PA 16802. Registration for courses is not complete until tuition and charges are paid.

Approximately six weeks in advance of each semester, the University will mail to each continu-



ing and newly admitted degree student of record an estimated bill for tuition and, where applicable, residence hall charges. Payment by mail is encouraged before the established deadline. The receipt is returned to the student by mail and will permit registration for the designated number of credits. This receipt is likewise authorization to obtain, where applicable, the residence hall key and meal ticket. If checks tendered for payment of tuition and charges are not paid upon presentation to the maker's bank, the student will automatically incur the late payment fee of \$25, and the receipt previously mailed will be considered null and void.

Any student who does not fulfill payment of obligations by the deadline established may be charged the late payment fee of \$25. This charge for late payment also applies to unpaid student supplemental charges. Students whose accounts are delinquent for more than ten days are subject to suspension from the University.

The University reserves the right to withhold transcripts and services to any current or former student who has an unsatisfied financial obligation to the University.

**WITHDRAWALS, COURSE DROPS, AND REFUNDS**—Refunds of tuition are based on the effective date of withdrawal from classes.

Charges for tuition are refundable upon withdrawal from the University only in the event the student obtains an official withdrawal form at the office of the dean of his or her college or other degree-granting unit and presents it at the Office of the Registrar not later than one calendar month after the effective date of withdrawal from classes.

In the event of withdrawal, charges for tuition will be refunded under the following policy:

Refund of 80 percent upon withdrawal before the end of the first week of the semester (seventh consecutive calendar day from the first day of classes) and a decrease of 10 percent for each week thereafter up to and including the eighth consecutive calendar week. No amount will be refunded for withdrawal after the eighth consecutive calendar week of the semester.

If a student is enrolled for 12 or fewer credits and drops 1 or more credits, refunds will be determined in accordance with the above policy.

For refund information for courses other than those taken for fifteen weeks, contact the fee assessor in 109 Shields Building.

Any refund policy related to adjustments in room and board will be a part of the housing contract.

## PENNSYLVANIA RESIDENCE

The policy for determination of a student's Pennsylvania resident status is as follows:

- A. *Pennsylvania Classification*—A student shall be classified as a Pennsylvania resident for tuition purposes if that student has resided in the Commonwealth for at least one calendar year before enrolling at The Pennsylvania State University.
  1. A student who does not have continuous residence in Pennsylvania for a period of twelve months immediately preceding enrollment at The Pennsylvania State University is presumed to be a non-Pennsylvanian for tuition purposes.
  2. A student attempting to obtain classification as a Pennsylvania resident for tuition purposes must be a citizen of the United States or must have indicated by formal action his/her intention to become a citizen or must have been admitted to the United States on an immigrant visa. A student admitted to the United States on a tourist or student (nonimmigrant) visa is not eligible for classification as a Pennsylvania resident for tuition purposes.
  3. A student under the age of twenty-one is presumed to have the residence of his/her parent(s) or legal guardian.
  4. A United States government employee or member of the armed forces who was a resident of Pennsylvania immediately preceding his/her entry into government service and who has continuously maintained Pennsylvania as his/her legal residence will be presumed to be a Pennsylvania resident.
  5. A student receiving a scholarship, guaranteed loan, grant, or other form of financial



## GENERAL INFORMATION

assistance dependent upon residence in a state other than Pennsylvania is not a Pennsylvania resident for tuition purposes.

- B. *Reclassification of Residency*—A student requesting reclassification as a Pennsylvania resident for tuition purposes must demonstrate by clear and convincing evidence that his/her permanent residence is in Pennsylvania. Each case shall be decided individually on the basis of all facts submitted by the petitioner. While it is not possible to require a given number of factors or a specific set of circumstances, the following may be considered convincing evidence when presented by those petitioning for reclassification as Pennsylvania residents for tuition purposes.
1. Purchase of a permanent, independent residence. This must be the principal residence of the student and/or his/her parent(s) or guardian.
  2. Payment of applicable state and local taxes on income earned either as a resident or outside the Commonwealth and the filing of appropriate returns for such taxes.
  3. Financial self-support and emancipation: Students who claim financial self-support or emancipation should provide the following evidence to support their claim:
    - a. Complete financial disclosure with appropriate evidence to indicate sufficient income to provide minimum funds for tuition, living, and related expenses as determined by the University's Office of Student Aid.
    - b. Copy of latest Pennsylvania and federal personal income tax returns.
    - c. Sworn statement from parent(s) or legal guardian that the student will not be claimed as a dependent on current or future federal income tax returns.
  4. Presentation of clear and convincing evidence that although the parent(s) or guardian on whom the student is dependent resides or has moved outside the Commonwealth, the student has maintained continuous residence in the Commonwealth for a period of at least one year prior to enrolling at the University and continues to maintain such separate residence.
  5. The student may submit evidence of any other facts believed to be relevant to the reclassification request, such as evidence of full-time employment in Pennsylvania or registration to vote.
- C. *Reclassification Procedure*
1. A student may challenge his/her residence classification by filing a written petition with the person or committee designated to consider such challenges at the University. Such person or committee shall consider such petition and render a timely decision.
  2. Any reclassification resulting from a student's challenge or appeal shall be effective at the beginning of the semester or session during which the challenge or appeal was filed or at the beginning of the following semester or session. The decision as to which semester or session becomes the effective date shall rest with the person or committee rendering the decision on reclassification.
  3. A student who changes his/her place of residence from Pennsylvania to another state is required to give prompt written notice of this change to the University and shall be reclassified as a non-Pennsylvanian for tuition purposes effective with the date of such change.
  4. A dependent resident student whose parent(s) or guardian(s) move outside of the Commonwealth may remain a Pennsylvania resident for tuition purposes if he/she continues to maintain a separate residence within the Commonwealth.

## NONRESIDENT STUDENT CLASSIFICATION

- A. A student is initially classified as a nonresident based on information provided by the student when applying for admission to the University. The initial classification is made as follows:
1. Undergraduate Student
    - a. Capitol Campus—Academic Services Officer
    - b. All other locations—Undergraduate Admissions Office, University Park, Pennsylvania
  2. Graduate Student
    - a. Capitol Campus—Academic Services Officer
    - b. All other locations—Dean of the Graduate School

3. Medical Student  
Milton S. Hershey Medical Center—Office of Student Affairs
- B. A student may challenge his/her residency classification by filing a written petition as follows:
  1. Undergraduate Student
    - a. Capitol Campus—Capitol Campus Financial Officer
    - b. All other locations—Fee Assessor
  2. Graduate Student
    - a. Capitol Campus—Capitol Campus Financial Officer
    - b. All other locations—Fee Assessor
  3. Medical Student  
Milton S. Hershey Medical Center—Controller
- C. The appropriate University official reviews the student's petition and makes a residency decision.
- D. The student may appeal that officer's residency decision to the University Appeals Committee on Residence Classification having representation from the Controller's Office, Undergraduate Admissions Office, and Graduate School. The committee's decision on appeal shall be final.

## MAJORS

### GENERAL DEGREE REQUIREMENTS

There are a number of areas in which a certain level of competence is expected of all recipients of associate degrees. Therefore, all associate degree programs of the University demand the satisfactory completion of the following requirements:

- 3 credits in the social sciences
- 3 credits in the arts and humanities
- 3 credits in English
- 3 credits in speech communication
- 6 credits in the physical sciences, biological science, or mathematics
- 3 credits in any of the above categories; to be determined by the department

**RESERVATIONS**—The University reserves the right to make such program or class changes as may become necessary because of insufficient enrollment or other contingencies. The University also reserves the right to make any necessary changes in tuition and charges without prior notice. Courses and programs described and listed in this bulletin are also subject to change without notice.

### AGRICULTURAL BUSINESS (2 AGB)

The Agricultural Business major prepares students for employment in commercial agriculture and businesses serving agriculture. Three options allow students to specialize in either crop or livestock production or in agricultural business, which provides training in management, business organization, and sales.

The first two semesters are offered at selected Commonwealth Campuses where students fulfill basic course requirements in accounting, business, English, and natural and social sciences. The second year at the University Park Campus provides course work in livestock and crop produc-

## AGRICULTURAL BUSINESS

tion, management, and agricultural business. As part of the requirements, there are supporting courses in agricultural engineering, farm management, agricultural marketing and sales. Each option allows the student a choice of electives to satisfy special interests and needs.

Graduates of the Agricultural Business major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Business Administration, Humanities, or Public Policy offered at the Capitol Campus.

For the Associate in Science degree in Agricultural Business, 68 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 23 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015(3), SPCOM 100(3)	x	—
QUANTIFICATION AND NATURAL SCIENCES (8 credits)		
BIOL 101(4), 102(4)	x	—
ARTS AND HUMANITIES (3 credits)		
Selection from University list (3)	x	—
SOCIAL SCIENCES (3 credits)		
Selection from University list (3)	x	—
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 201(3) or select 3 credits in speaking or writing	x	—
<b>REQUIREMENTS FOR THE MAJOR: 45 credits</b>		
<b>COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 9 credits</b>		
PRESCRIBED COURSES (9 credits)		
ACCTG 101(3), B LAW 243(3), CHEM 011(3)	x	—
<b>REQUIREMENTS FOR THE OPTION: 36 credits</b>		
<b>ANIMAL PRODUCTION OPTION: 36 credits</b>		
PRESCRIBED COURSES (18 credits)		
AG E 214(3), AGRO 028(3), 200(3), AN SC 100(3), 202(3), PTYSC 201(1), 202(2)	—	x
ADDITIONAL COURSES (6 credits)		
AG EC 101, 106, or 208(3)	—	x
AN SC 007 or 201(3)	—	x
SUPPORTING COURSES AND RELATED AREAS (9 credits)		
Select 6 credits in agricultural economics	—	x
Select 3 credits in agricultural engineering	—	x
ELECTIVES (3 credits)	—	x
<b>CROP PRODUCTION OPTION: 36 credits</b>		
PRESCRIBED COURSES (18 credits)		
AG E 214(3), 322(3), AGRO 028(3), 200(3), AG EC 102(3), ENT 012(3)	—	x
ADDITIONAL COURSE (3 credits)		
AG EC 101, 106, or 208(3)	—	x
SUPPORTING COURSES AND RELATED AREAS (6 credits)		
Select 3 credits in animal science or poultry science	—	x
Select 3 credits in horticulture		
ELECTIVES (9 credits)	—	x

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL OPTION: 36 credits</b>		
<b>PRESCRIBED COURSES (6 credits)</b>		
AG EC 297(3), AGRO 200(3)	—	x
<b>ADDITIONAL COURSES (15 credits)</b>		
AG EC 101 or 208(3); AG EC 102 or 232(3)	—	x
AG EC 106 or 200(3); AGRO 028 or PLTSC 200(3)	—	x
MGMT 100 or MKTG 220(3)	—	x
<b>SUPPORTING COURSES AND RELATED AREAS (12 credits)</b>		
Select 3 credits in agriculture or business	—	x
Select 3 credits in agricultural engineering	—	x
Select 6 credits in animal or poultry science	—	x
<b>ELECTIVES (3 credits)</b>		

ARCHITECTURAL ENGINEERING  
TECHNOLOGY (2 AET)

The Architectural Engineering Technology major is designed to provide technically trained personnel between the level of high school graduate and professional architectural engineer or architect to support the architectural design and construction industries. Architectural engineering technicians work under the supervision of a graduate architect or architectural engineer. They translate sketches and design concepts into working drawings and specifications. To do so, they need basic skills in structural and environmental systems design and layout, familiarity with site planning, knowledge of building materials and equipment characteristics and performance, as well as the training in drafting techniques required for the realization of final drawings and specifications. The graduates of this major are prepared for employment in architectural, building engineering, or industrialized housing firms.

Graduates of the Architectural Engineering Technology major may qualify for admission to baccalaureate degree majors in Energy Technology, Mechanical Engineering Technology, or Structural Design and Construction Engineering Technology offered at the Capitol Campus. Or they may qualify for admission to the Mechanical Design and Materials option of the baccalaureate degree major in Energy and Environmental Technology offered at the Behrend College.

For the Associate in Engineering degree in Architectural Engineering Technology, 68-69 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
<b>COMMUNICATIONS (6 credits)</b>		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (9 credits)</b>		
MATH 807(5), 808(4)	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
Select 3 credits in arts or humanities	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.



	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
CMPSC 101(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 42-43 credits</b>		
PREScribed COURSES (39 credits)		
AE T 801(3), 802(3), 803(3), 813(2), E G 001(2), E MCH 811(3), PHYS 150(3)	x	—
AE T 804(3), 806(2), 807(3), 810(3), 814(3), 815(3), PHYS 151(3)	—	x
ADDITIONAL COURSES (5-6 credits)		
Select 5-6 credits from the following technical courses: AE T 812, 830, CHEM 011, CE T 861, CMPSC 102, EE T 800, E G 012, 803, 830, E MCH 813, IE T 805, MATH 140, 141, 231, 250, ME T 807, 881, S T 801, or 830	—	x

## BIOMEDICAL EQUIPMENT TECHNOLOGY (2 BET)

During the past several decades, the medical community has grown to depend increasingly on machines for the delivery of quality health care. Biomedical equipment technicians are men and women responsible for maintaining these machines in accurate and safe working order. Their tasks include functional and safety inspecting, preventive maintenance, calibration, troubleshooting, and repair of this equipment. In addition, they may be involved in equipment control programs, in electrical safety assurance programs, and in training hospital personnel in the safe and proper use of the equipment. The classroom and laboratory portions of this major focus on electronically-based patient monitoring equipment. The student is, however, exposed to a much broader spectrum of biomedical equipment through a ten-week practical internship in an approved health care facility.

Graduates of the Biomedical Equipment Technology major may qualify for admission to the baccalaureate degree major in Electrical Engineering Technology offered at the Capitol Campus. Or they may qualify for admission to the Instrumentation and Controls option of the baccalaureate degree major in Energy and Environmental Technology offered at the Behrend College.

For the Associate in Engineering degree in Biomedical Equipment Technology, 72 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4	Summer
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 015*(3)	x	—	—
SPCOM 100(3)	—	x	—
QUANTIFICATION AND NATURAL SCIENCES (9 credits)			
MATH 807(5), 808(4)	x	—	—

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

<b>ARTS AND HUMANITIES (3 credits)</b>			
Select 3 credits in arts or humanities	—	x	—
<b>SOCIAL SCIENCES (3 credits)</b>			
Select 3 credits in social sciences	—	x	—
<b>GENERAL EDUCATION SELECTION (3 credits)</b>			
CMPSC 101(3)	x	—	—
<b>REQUIREMENTS FOR THE MAJOR: 48 credits</b>			
<b>PRESCRIBED COURSES (45 credits)</b>			
EE T 801(4), 805(1), 809(1), 810(3), 814(3), 818(2), E G 001(2)	x	—	—
BIOL 041(3), CHEM 011(3), PHYS 150(3), 151(3)	x	x	—
B E T 801(5), 802(5), 804(3)	—	x	—
B E T 803(4)	—	—	x
<b>ADDITIONAL COURSE (3 credits)</b>			
Select 3 credits from the following technical courses: B E T 830, BIOL 029, CH ET 831, CE T 861, CMPSC 102, EE T 811, 813, 817, 830, E G 803, E MCH 811, I E 315, MATH 140, 141, 231, or ME T 807	—	x	—

## BUSINESS ADMINISTRATION (2 B A)

The two-year, college-level academic Business Administration major is designed to provide instruction in business administration that fulfills the requirements of various levels of responsibility higher than that held by high school graduates.

The primary objective of this major is to provide a managerially-oriented program with sufficient communicative and mathematical skills, socially relevant course work, and advanced courses in specific business specialties to develop a well-rounded graduate.

Graduates of the Business Administration major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Business Administration, Humanities, or Public Policy offered by the Capitol Campus. Or they may qualify for one of the following baccalaureate degree majors offered at the Behrend College: Accounting, Business Economics, General Business, Management, or Management Information Systems.

For the Associate in Science degree in Business Administration, 68 credits are required.

*Scheduling Recommendation  
by Semester Standing*

	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
<b>COMMUNICATIONS (6 credits)</b>		
ENGL 004*(3)	x	—
SPCOM 100(3)	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (6 credits)</b>		
MATH 005(3)	x	—
Select 3 credits in natural sciences	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
Select 3 credits in arts or humanities	—	x

\*Students who exempt ENGL 004 may substitute 3 credits of electives.

## CHEMICAL ENGINEERING TECHNOLOGY

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 826(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 47 credits</b>		
PREScribed COURSES (24 credits)		
ACCTG 801(3), 802(3), B LAW 243(3), ENGL 015(3), FIN 100(3), MGMT 100(3), M I S 100(3), MKTG 221(3)	x	x
ADDITIONAL COURSES (21 credits)		
Q B A 101 or 801(3)	x	—
ECON 002, 004, or 014#(3)	—	x
Select 15 credits from ACCTG 803, 806, 807, 810, B A 250, 803, B LAW 850, B LOG 301, 304, 305, CMPSC 101, 102, 140, 803, 890, ECON 002 +, 004 +, FIN 108, 810, INS 102, 810, 820, 830, I B 862, L S 100, M I S 103, 106, 110, 111, MGMT 802, MKTG 220, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, OPMG 801, Q B A 102, R EST 100, 810, or 830	—	x
SUPPORTING COURSES AND RELATED AREAS (2 credits)		
Select 2 credits in physical education	x	x

#Students going on to a four-year program should not take ECON 014.

+ Select the course not taken above.

## CHEMICAL ENGINEERING TECHNOLOGY (2CHET)

The Chemical Engineering Technology major prepares students for positions as assistants to chemists, chemical engineers, and petroleum engineers, assistants in research and control laboratories, and trainees for future supervisory positions in manufacturing and production. Graduates of the major have a reasonable proficiency in basic sciences (chemistry, mathematics, and physics), communication skills, and the basic principles of chemical engineering technology.

Graduates from the Chemical Engineering Technology major may qualify for admission to the baccalaureate degree majors in Energy Technology or in Water Resources Engineering Technology offered at the Capitol Campus. Or they may qualify for admission to the Instrumentation and Controls option of the baccalaureate degree major in Energy and Environmental Technology offered at the Behrend College.

For the Associate in Engineering degree in Chemical Engineering Technology, 68-69 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>QUANTIFICATION AND NATURAL SCIENCES (9 credits)</b>		
MATH 807(5), 808(4)	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
Select 3 credits in humanities	—	x
<b>SOCIAL SCIENCES (3 credits)</b>		
Select 3 credits in social sciences	—	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>		
CMPSC 101(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 44-45 credits</b>		
<b>PRESCRIBED COURSES (39-40 credits)</b>		
E G 001(2), PHYS 150(3)	x	—
CHEM 012(3-4), 013(3), 014(1), 015(1), 023(4), 034(3), PHYS 151(3)	x	x
CH ET 810(4), 811(5), 821(2), 822(2), 830(3)	—	x
<b>ADDITIONAL COURSES (5 credits)</b>		
Select 5 credits from the following technical courses: BI SC 003, BIOL 041, 101, CH ET 831, CHEM 035, CMPSC 102, E G 803, 830, E MCH 811, I E 315, IE T 805, MATH 140, 141, 231, 250, METEO 003, or MICRB 106	—	x

## CLINICAL HEALTH SERVICES (2 CHS)

The goal of the Clinical Health Services major is to educate students to assist physicians in providing health care to patients in a primary-care setting.

The major is twenty-one months in length, with two semesters of work in the basic and clinical sciences, one semester (the summer session between the first and second academic year) of activity in the area of categorical clinical experiences, with the final two semesters being spent in a preceptorship in a primary-care environment. Upon completion of the major, the student may take the National Certification Examination for physician assistants.

Admission requirements include 60 undergraduate credits from a regionally approved college or university, or equivalent, including a 3-credit college-level course in each of the following: English composition, speech communication, humanities, anatomy and physiology, biology, mathematics, microbiology, sociology, and psychology.

For more information, write to The Milton S. Hershey Medical Center, 500 University Drive, Hershey, PA 17033.

For the Associate in Science degree in Clinical Health Services, 72 credits are required.

This program is not currently being offered to entering students.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4	5-6
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>			
<b>COMMUNICATIONS (6 credits)</b>			
Students are admitted with advanced standing			
<b>QUANTIFICATION AND NATURAL SCIENCES (6 credits)</b>			
Students are admitted with advanced standing			
<b>ARTS AND HUMANITIES (3 credits)</b>			
Students are admitted with advanced standing			



<i>Scheduling Recommendation by Semester Standing</i>			
	1-2	3-4	5-6
<hr/>			
SOCIAL SCIENCES (3 credits)			
Students are admitted with advanced standing			
<hr/>			
GENERAL EDUCATION SELECTION (3 credits)			
Students are admitted with advanced standing			
<hr/>			
REQUIREMENTS FOR THE MAJOR: 72 credits			
<hr/>			
PRESCRIBED COURSES (72 credits)			
P A 800(7), 801(7), 805(1), 810(3), 820(3),			
821(3), 840(2), 841(2), 850(3), 870(1),			
871(1)			
	x	—	—
P A 878(9), 880(15)	—	x	—
P A 881(15)	—	—	x

COMMUNITY SERVICES (2ECSV)

The Community Services major is designed to provide entry-level professional competency in one of several human service fields. The objective of the major is to provide a general education background, a knowledge base in human development, and a core of professional skills in a particular human services area. Challenges, issues and problems, current approaches and procedures, and elements of program planning and services provision are studied. The major has three options.

The Administration of Justice option is designed to prepare persons for career roles in police departments, probation and parole agencies, and correctional institutions.

The Adult Development and Aging option is designed to prepare persons for a wide variety of service roles in boarding homes, nursing homes, area agencies on aging, senior citizen centers, and other sites which provide services for the elderly.

The Child and Youth Services option is designed to prepare persons for a wide variety of service roles in day and institutional child care agencies, preschools, head start centers, and other child and youth service settings.

The Community Services major includes one semester of field experience in a local community agency.

Graduates of the Community Services major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Humanities, or Public Policy offered at the Capitol Campus.

For the Associate in Science degree in Community Services, 62 credits are required.

<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4
<hr/>		
GENERAL DEGREE REQUIREMENTS: 21 credits		
<hr/>		
COMMUNICATIONS (6 credits)		
ENGL 015(3), SPCOM 100(3)	x	—
<hr/>		
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
Selections from University list (6)	x	—
<hr/>		
ARTS AND HUMANITIES (3 credits)		
Selection from University list (3)	x	—
<hr/>		
SOCIAL SCIENCES (3 credits)		
Selection from University list (3)	x	—
<hr/>		
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 201, 211, 218, or 219(3)	x	—

*Scheduling Recommendation  
by Semester Standing*

	1-2	3-4
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**REQUIREMENTS FOR THE MAJOR: 41 credits**


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**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 15 credits**


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**PRESCRIBED COURSES (7 credits)**

H DEV 100(1), 101(3), 102(3)

X

—

**ADDITIONAL COURSES (8 credits)**

ADM J 395\* or H DEV 395\*(8)

—

X

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**REQUIREMENTS FOR THE OPTION: 26 credits**


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**ADMINISTRATION OF JUSTICE OPTION: 26 credits**
**PRESCRIBED COURSES (11 credits)**

ADM J 111(3)

X

—

ADM J 221(3), 240(1), 241(2), 394(1), 396(1)

—

X

**SUPPORTING COURSES AND RELATED AREAS (15 credits)**

Select 15 credits of professional electives in  
consultation with adviser

—

X

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**ADULT DEVELOPMENT AND AGING OPTION: 26 credits**
**PRESCRIBED COURSES (6 credits)**

I F S 129(3), 249(3)

X

—

**ADDITIONAL COURSES (9 credits)**

Select 9 credits from I F S 218, 219, 229,  
239, 311, 315, 327, or NUTR 251

X

X

**SUPPORTING COURSES AND RELATED AREAS (11 credits)**

Select 11 credits of professional electives in adult  
development and aging in consultation with adviser

—

X

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**CHILD AND YOUTH SERVICES OPTION: 26 credits**
**PRESCRIBED COURSES (3 credits)**

I F S 129(3)

X

—

**ADDITIONAL COURSES (12 credits)**

Select 3 credits from I F S 229 or 239

X

X

Select 9 credits from I F S 218, 219, 311, 315,  
327, 330, or NUTR 251

—

X

**SUPPORTING COURSES AND RELATED AREAS (11 credits)**

Select 11 credits of professional electives in child  
services and child development in consultation  
with adviser

—

X

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**\*Guidelines for Field Placement include:**

1. Agencies utilized are local agencies.
2. Priority for placement is made for students with higher semester standings.
3. Prerequisites for placement include for Administration of Justice — ADM J 111, H DEV 102; for Adult Development and Aging — H DEV 101, I F S 249; for Child and Youth Services — H DEV 101; I F S 229 or 239.

COMPUTER SCIENCE (2CPSC)

The primary objective of the two-year Computer Science major is to prepare graduates for immediate and continuing employability as application programmers, associate systems designers, or associate systems programmers.

To meet this objective the major is designed to ensure a thorough knowledge of the techniques of programming general-purpose digital computers, and includes extensive practice—using contemporary programming technologies—in the analysis, organization, validation, and documentation of effective computer code. The major also includes courses offering practical knowledge of the logical organization of modern digital computers and related peripheral equipment, the structure of operating systems and compilers, and considerations in the design of information systems.

The General Education Requirements provide the student with an extension to the basic educational foundation. The General Requirements for the Major give the graduate technical competence in the computing and data processing field. The Application Specialization provides a practical knowledge of an area of application within which the graduate may profitably utilize the acquired computing talent.

Graduates of the Computer Science major may qualify for admission to the baccalaureate degree majors in Business Administration or Mathematical Sciences offered at the Capitol Campus. Or they may qualify for admission to one of the following baccalaureate degree majors offered at the Behrend College: Accounting, Business Economics, General Business, Management, or Management Information Systems.

For the Associate in Science degree in Computer Science, 64 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
MATH 017(3), 018(3)	x	—
ARTS AND HUMANITIES (3 credits)	—	x
SOCIAL SCIENCES (3 credits)	—	x
GENERAL EDUCATION SELECTION (3 credits)		
Select 3 credits in Q B A or STAT [see departmental list]	—	x
<b>REQUIREMENTS FOR THE MAJOR: 43 credits</b>		
PRESCRIBED COURSES (31 credits)		
CMPSC 100(3), 101(3), 102(3), 140(3), ENGL 218(3)	x	x
CMPSC 142(3), 144(4), 154(3), 164(3), 174(2), 175(1)	—	x
SUPPORTING COURSES AND RELATED AREAS (12 credits)		
Technical specialization and related work [see departmental list] (12)	x	x

DIETETIC FOOD SYSTEMS MANAGEMENT (2EDSM)

The purpose of the Dietetic Food Systems Management major is to prepare food systems management dietetic technicians for middle management positions in the food service area of health care facilities or community feeding operations. Candidates for admission to this major must be employed at least fifteen hours a week in a health care facility food service operation where their work is supervised by a registered dietitian. Graduates become eligible for technician membership in the American Dietetic Association.

Students who meet admission criteria are admitted to the extended degree major in Dietetic Food Systems Management. The required courses are available primarily through correspondence study offered by the Department of Independent Learning.

Students who achieve outstanding records may, upon completion of this major, apply for admission to the Management Dietetics option of the baccalaureate degree major in Hotel, Restaurant, and Institutional Management in the College of Human Development. Five additional semesters of satisfactory work are required to earn the baccalaureate degree.

Graduates of this major may also qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Business Administration, Humanities, or Public Policy offered at the Capitol Campus.

For the Associate in Science degree in Dietetic Food Systems Management, 68-69 credits are required.

*Scheduling Recommendation  
by Semester Standing*

	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015(3), SPCOM 100(3)	x	—
QUANTIFICATION AND NATURAL SCIENCES (6-7 credits)		
MATH 035, STAT 200, or CMPSC 101(3-4)	x	—
BIOL 041(3)	x	—
ARTS AND HUMANITIES (3 credits)	x	x
SOCIAL SCIENCES (3 credits)		
SOC 001 or 003(3)	x	—
GENERAL EDUCATION SELECTION (3 credits)		
ECON 002, 004, or 014(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 47 credits</b>		
PRESCRIBED COURSES (32 credits)		
D S M 100(1), 103(3), 250(4), 260(4), 295(4), 304(3), HR&IM 337(3), H P A 101(3), H F S 802(3), NUTR 252(4)	x	x
ADDITIONAL COURSES (12 credits)		
ACCTG 101 or 801(3)	x	x
EDPSY 014 or 297(3)	x	x
D S M 205 or MGMT 321 or 341(3)	x	x
NUTR 251 or 801(3)	x	x
SUPPORTING COURSES AND RELATED AREAS (3 credits)		
Select 3 credits in consultation with the student's adviser to develop competence as a dietetic practitioner	x	x

## ELECTRICAL ENGINEERING TECHNOLOGY (2 EET)

The Electrical Engineering Technology major prepares graduates for technological service with manufacturers of electrical, electronic, and computer equipment; electrical utilities; and electrical maintenance and instrumentation departments of various industrial concerns. The principal objective is to provide a practical knowledge of electronic, digital, and microprocessor theory as well as electrical machinery and its application.

Graduates of the Electrical Engineering Technology major may qualify for admission to the baccalaureate degree majors in Electrical Engineering Technology or in Energy Technology offered at the Capitol Campus. Or they may qualify for admission to the Instrumentation and Controls option of the baccalaureate degree major in Energy and Environmental Technology offered at the Behrend College.



FOREST TECHNOLOGY

For the Associate in Engineering degree in Electrical Engineering Technology, 70-71 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (9 credits)		
MATH 807(5), 808(4)	x	—
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
CMPSC 101(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 46-47 credits</b>		
PRESCRIBED COURSES (44 credits)		
E G 001(2), EE T 801(4), 805(1), 809(1), 810(3), 814(3), 818(2), PHYS 150(3)	x	—
EE T 804(2), 806(1), 811(3), 813(3), 815(3), 816(3), 817(4), 819(1), 820(1), 821(1), PHYS 151(3)	—	x
ADDITIONAL COURSES (2-3 credits)		
Select 2-3 credits from the following technical courses: BI SC 003, CHEM 011, 012, CE T 861, CMPSC 102, EE T 830, E G 003, 803, 830, E MCH 810, 811, I E 315, IE T 805, MATH 140, 141, 231, ME T 800, or 807		
	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

FOREST TECHNOLOGY (2FORT)

The objectives of the Forest Technology major are to train students in the techniques that are basic to planning, organizing, directing, and managing forestry enterprises and to provide a program of general studies which will serve as a foundation for future intellectual growth. It is intended that graduates will act in a supporting capacity to professional foresters.

Graduates of the Forest Technology major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Humanities, or Public Policy offered at the Capitol Campus.

For the Associate in Science degree in Forest Technology, 69 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 015(3), SPCOM 100(3)	x	—	—

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>QUANTIFICATION AND NATURAL SCIENCES (6 credits)</b>			
MATH 800(3), BIOL 027(3)	x	—	—
<b>ARTS AND HUMANITIES (3 credits)</b>			
Select 3 credits in arts or humanities	—	—	x
<b>SOCIAL SCIENCES (3 credits)</b>			
Select 3 credits in social sciences	—	—	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>			
ENGL 218(3)	—	—	x
<b>REQUIREMENTS FOR THE MAJOR: 48 credits</b>			
<b>PRESCRIBED COURSES (42 credits)</b>			
FOR 137(1), 138(1), 140(2), 141(4), 245(2), 250(3)	x	—	—
FOR 105(3), 106(2), 108(1)	x	x	—
FOR 234(3), 240(3), 241(4), 242(3)	x	—	x
FOR 814(1), 822(1), 860(1)	—	x	x
ACCTG 101(3), FOR 220(3), 221(1)	—	—	x
<b>ADDITIONAL COURSES (6 credits)</b>			
Select 6 credits from FOR 807(3), 817(3), or WILDL 101(3)	—	x	x

## HIGHWAY ENGINEERING TECHNOLOGY (2 HET)

The Highway Engineering Technology major prepares highway construction technicians to perform many of the planning and design tasks necessary in the construction of highways, railroads, bridges, and airports. In the planning stages of construction, a highway construction technician may be engaged in estimating costs, purchasing materials, preparing specifications, computing fills, cuts, and drainage requirements, drafting, designing, or surveying. During actual construction such technicians may perform supervisory functions and inspection.

Graduates of the Highway Engineering Technology major may qualify for admission to the baccalaureate degree major in Structural Design and Construction Engineering Technology offered at the Capitol Campus.

For the Associate in Engineering degree in Highway Engineering Technology, 69 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
<b>COMMUNICATIONS (6 credits)</b>		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (9 credits)</b>		
MATH 807(5), 808(4)	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
Select 3 credits in arts or humanities	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015. ENGL 218 or 826 is required for all students in the program.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<hr/>		
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
<hr/>		
GENERAL EDUCATION SELECTION (3 credits)		
CMPSC 101(3)	x	—
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REQUIREMENTS FOR THE MAJOR: 45 credits		
<hr/>		
PRESCRIBED COURSES (45 credits)		
CE T 809(2), 811(3), 812(3), 818(2), E G 001(2), ENGL 826(3), PHYS 150(3)	x	—
CE T 814(3), 821(3), 822(3), 823(3), 824(3), 825(3), E MCH 811(3), 813(3), PHYS 151(3)	—	x

**HOTEL, RESTAURANT, AND INSTITUTIONAL  
MANAGEMENT (2HRIM)**

The Hotel, Restaurant, and Institutional Management major is an intensive four-semester major designed to prepare students for managerial positions in the hospitality industry. The course of study places heavy reliance on experience acquired in an on-the-job setting.

Students who achieve outstanding records may, upon completing this program, apply for admission to the baccalaureate degree major in Hotel, Restaurant, and Institutional Management in the College of Human Development. Six or more additional semesters of satisfactory work are required to earn the baccalaureate degree.

Or graduates of this major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Business Administration, Humanities, or Public Policy offered at the Capitol Campus.

For the Associate in Science degree in Hotel, Restaurant, and Institutional Management, 66 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<hr/>		
GENERAL DEGREE REQUIREMENTS: 21 credits		
<hr/>		
COMMUNICATIONS (6 credits)		
ENGL 015(3), SPCOM 100(3)	x	—
<hr/>		
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
Select 6 credits from University list	x	—
<hr/>		
ARTS AND HUMANITIES (3 credits)		
Select 3 credits from University list	x	—
<hr/>		
SOCIAL SCIENCES (3 credits)		
Select 3 credits in Economics	x	—
<hr/>		
GENERAL EDUCATION SELECTION (3 credits)		
Select 3 credits from ENGL 201, 218, or 219	x	—
<hr/>		
REQUIREMENTS FOR THE MAJOR: 45 credits		
<hr/>		
PRESCRIBED COURSES (37 credits)		
ACCTG 101(3), HR&IM 102(2), 290(3), 301(3), 310(3), H F S 804(3)	x	—
HR&IM 295(2), 320(3), 337(3), 850(4), 860(4), 870(4)	—	x

*Scheduling Recommendation  
by Semester Standing*

	1-2	3-4
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**SUPPORTING COURSES AND RELATED AREAS (8 credits)**

Select 3 credits in nutrition	—	x
Select 5 credits in consultation with adviser to develop a competency in management or general business administration	—	x

**LABOR STUDIES (2ELBR)**

The purpose of the Labor Studies major is to help employees improve their understanding and competence in coping with personal, group, and organizational problems at their worksites, in relationships with employers, and in transactions with the community, the economy, and the polity. The major consists of a core of labor courses supplemented by introductory liberal arts studies which provide (1) basic communication skills, (2) conceptual tools of analysis, and (3) a more general cultural context for the examination of labor problems.

Graduates of the Labor Studies major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Business Administration, Humanities, or Public Policy offered at the Capitol Campus.

For the Associate in Arts degree in Labor Studies, 60 credits are required.

*Scheduling Recommendation  
by Semester Standing*

	1-2	3-4
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**GENERAL DEGREE REQUIREMENTS: 21 credits**

COMMUNICATIONS (6 credits)	x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)	x	—
ARTS AND HUMANITIES (3 credits)	x	—
SOCIAL SCIENCES (3 credits)	x	—
GENERAL EDUCATION SELECTION (3 credits)	x	—

**REQUIREMENTS FOR THE MAJOR: 39 credits**

<b>PRESCRIBED COURSES (18 credits)</b>		
L S 100(3), 102(3), 103(3), 104(3), 156(3), 296(3)	x	x
<b>SUPPORTING COURSES AND RELATED AREAS (21 credits)</b>		
Select 21 credits from the following areas in consultation with adviser: economics, history, industrial engineering, journalism, labor studies, management, political science, psychology, sociology	x	x

**LETTERS, ARTS, AND SCIENCES (2 LAS)**

The objectives of the Letters, Arts, and Sciences major are to broaden the student's understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student's interests or career plans. Letters, Arts, and Sciences is a complete two-year degree major. However, graduates who later seek admission to baccalaureate degree majors may apply baccalaureate credits toward the new degree. Any 800-level credits taken in the Letters, Arts, and Sciences program are not applicable toward most baccalaureate degrees.



## LETTERS, ARTS, AND SCIENCES

Graduates of the Letters, Arts, and Sciences major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Elementary Education, Humanities, or Public Policy offered at the Capitol Campus. Or they may qualify for any of a large number of baccalaureate degree majors offered by the Behrend College in business, the liberal arts, and sciences.

For the Associate in Arts degree in Letters, Arts, and Sciences, 60 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits#</b>		
COMMUNICATIONS (6 credits)		
ENGL 015*(3), SPCOM 100(3)	x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)		
Select 3 credits in mathematics (MATH 004 not acceptable), statistics, computer science, or philosophy (PHIL 012 and 212 only) +	x	x
Select 3 credits in any courses designated as physical, biological, or earth sciences +	x	x
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in any courses designated as arts +	x	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in any courses designated as social and behavioral sciences +	x	x
GENERAL EDUCATION SELECTION (3 credits)		
ENGL 201, 211, 218, or 219(3)	x	x
<b>REQUIREMENTS FOR THE MAJOR: 39 credits</b>		
SUPPORTING COURSES AND RELATED AREAS (24 credits)#		
Select 3 credits in any courses designated as arts +	x	x
Select 6 credits in any courses designated as humanities +	x	x
Select 3 credits in any courses designated as social and behavioral sciences +	x	x
Select 3 credits in any courses designated as physical, biological, or earth sciences +	x	x
Select 9 credits in any one of the following areas: + arts, humanities, social and behavioral sciences, natural sciences and quantification, and foreign language skills. (If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.)	x	x
ELECTIVES (15 credits)	x	x

#The 45 required and related credits must be baccalaureate-level courses. For those intending to seek admission to a baccalaureate program upon graduation, it is recommended that most, if not all, of the courses be at the baccalaureate level. For those students who will seek a Bachelor of Arts degree upon graduation from Letters, Arts, and Sciences, it is strongly recommended that a foreign language be taken since admission to a Bachelor of Arts program in the College of the Liberal Arts requires one college-level course, or the equivalent, in a foreign language.

\*Students will be placed in ENGL 004, 015, or 030 on the basis of English Placement Test scores. If a student is placed in ENGL 030, successful completion of that course will satisfy the English 015 requirement. Students must take ENGL 201, 211, 218, or 219 as part of the General Education Selection of the major.

+ Courses which will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checklist, which may be obtained from the College of the Liberal Arts associate dean for undergraduate studies at the University Park Campus or from any Letters, Arts, and Sciences representative at the Commonwealth Campuses.

## MECHANICAL ENGINEERING TECHNOLOGY (2 MET)

The Mechanical Engineering Technology major is intended to prepare detail or layout drafters and designers for manufacturing industries as well as for the many concerns engaged in installation or erection work. The principal objective is to prepare men and women for employment in machine design, tool and die design, or structural layout. Some graduates are involved in technical or industrial sales, become supervisors in light and heavy industry, or enter management trainee programs.

Graduates of this major may qualify for admission to the baccalaureate degree majors in Mechanical Engineering Technology, Structural Design and Construction Engineering Technology, or Transportation Engineering Technology offered at the Capitol Campus. Or they may qualify for admission to the Mechanical Design and Materials option of the baccalaureate degree major in Energy and Environmental Technology offered at the Behrend College.

For the Associate in Engineering degree in Mechanical Engineering Technology, 67-68 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 015*(3)	x	—	—
SPCOM 100(3)	—	—	x
QUANTIFICATION AND NATURAL SCIENCES (9 credits)			
MATH 807(5), 808(4)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	—	x
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	—	x
GENERAL EDUCATION SELECTION (3 credits)			
CMPS 101(3)	x	—	—
<b>REQUIREMENTS FOR THE MAJOR: 43-44 credits</b>			
PRESCRIBED COURSES (38 credits)			
E G 001(2), 012(2), E MCH 811(3), IE T 811(3), PHYS 150(3)	x	—	—
IE T 812(3)	—	x¶	—
AE T 809(3), E G 803(3), E MCH 813(3), 814(1), IE T 815(3), ME T 805(3), 810(3), PHYS 151(3)	—	—	x
ADDITIONAL COURSES (5-6 credits)			
Select 5-6 credits from the following technical courses: BI SC 003, CHEM 011, 012, CE T 861, CMPS 102, EE T 800, E G 003, 830, E MCH 812, IE 315, IE T 805, MATH 140, 141, 231, 250, ME T 807, or 830			
	—	—	x

¶To be taken at a regional campus.

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

MEDICAL LABORATORY TECHNOLOGY (2 MLT)

The two-calendar-year Medical Laboratory Technology major (four semesters, two summer sessions) is designed to provide the necessary general and technical training for hospital personnel between the level of the medical laboratory technician (certificate program) and the medical technologist (baccalaureate program). The course of study includes one year of intensive clinical experience at an affiliated hospital and the theoretical background necessary for the clinical procedures performed by the certified medical laboratory technician (associate degree program). Upon completion of major requirements, the student receives the associate degree and is eligible to sit for examinations leading to certification and registry as a medical laboratory technician.

The program begins in the summer session.

Graduates of the Medical Laboratory Technology major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Humanities, or Public Policy offered at the Capitol Campus.

For the Associate in Science degree in Medical Laboratory Technology, 71-72 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	Summer	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 015(3), SPCOM 100(3)	x	—	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)			
MATH 004 or 005(3)	x	—	—
BIOL 041(3)	—	x	x
ARTS AND HUMANITIES (3 credits)			
Selection from University list (3)	x	—	—
SOCIAL SCIENCES (3 credits)			
Selection from University list (3)	x	x	—
GENERAL EDUCATION SELECTION (3 credits)			
Select 3 credits in social and behavioral sciences from University list	x	x	—
<b>REQUIREMENTS FOR THE MAJOR: 50-51 credits</b>			
PRESCRIBED COURSES (50-51 credits)			
MICRB 150(4)	x	—	—
CHEM 012(3-4), 014(1), 034(3), BIOL 029(4), 042(1), CMPSC 001(1), MICRB 201(3), 202(2)	—	x	—
MICRB 151A(9), 151B(6), 151C(6), 151D(5), 151E(2)	—	—	x

METALLURGICAL ENGINEERING TECHNOLOGY (2METE)

The Metallurgical Engineering Technology major prepares students for positions in the metallurgical and metals-oriented industries as technical personnel in research laboratories and in quality control, and as supervisors of service groups and of production operations.

Graduates of the Metallurgical Engineering Technology major may qualify for admission to the baccalaureate degree major in Energy Technology offered at the Capitol Campus.

For the Associate in Engineering degree in Metallurgical Engineering Technology, 72 credits are required.

*Scheduling Recommendation  
by Semester Standing*

	1-2	3-4
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**GENERAL DEGREE REQUIREMENTS: 23 credits**


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**COMMUNICATIONS (6 credits)**

ENGL 004 or 015(3)

x

—

SPCOM 100(3)

—

x

**QUANTIFICATION AND NATURAL SCIENCES (8 credits)**

MATH 807(5), CHEM 011(3)

x

—

**ARTS AND HUMANITIES (3 credits)**

Selection from University list (3)

—

x

**SOCIAL SCIENCES (3 credits)**

Selection from University list (3)

—

x

**GENERAL EDUCATION SELECTION (3 credits)**

Select 3 credits in Economics

—

x

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**REQUIREMENTS FOR THE MAJOR: 49 credits**


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**PRESCRIBED COURSES (43 credits)**

CHEM 012(3), 014(1), E G 001(2), MATH 808(4),

MET E 800(4), PHYS 150(3), 151(3)

x

—

CMPSC 101(3), EE T 800(2), IE T 809(3), MET E 801(2),

802(3), 803(3), 804(3), 805(3), 807(1)

—

x

**ADDITIONAL COURSES (6 credits)**

ENGL 201 or 826(3)

x

—

IE T 812 or MET E 806(3)

x

—

## MICROCOMPUTER ENGINEERING TECHNOLOGY (2MCMP)

The Microcomputer Engineering Technology major prepares graduates for technical positions in the rapidly expanding field of microcomputers and their applications. A broad background in electrical and electronic principles is used as a foundation upon which to build the basic concepts of the microprocessor, to examine its internal functions, and to investigate its applications. Exposure to a variety of microprocessor/microcomputer systems and devices used with computers as well as hands-on experience in the operation, analysis, and construction of small computer systems provides graduates with a sound foundation for installing, diagnosing, and servicing microprocessor/microcomputer systems and the devices used with them.

Graduates of the Microcomputer Engineering Technology major may qualify for admission to the baccalaureate degree majors in Electrical Engineering Technology or in Energy Technology offered at the Capitol Campus. Or they may qualify for the Instrumentation and Controls option of the baccalaureate Energy and Environmental Technology major offered at the Behrend College.

For the Associate in Engineering degree in Microcomputer Engineering Technology, 71-72 credits are required.



*Scheduling Recommendation  
by Semester Standing*

1-2	3-4
-----	-----

**GENERAL DEGREE REQUIREMENTS: 24 credits**

<b>COMMUNICATIONS (6 credits)</b>		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (9 credits)</b>		
MATH 807(5), 808(4)	x	—
<b>ARTS AND HUMANITIES (3 credits)</b>		
Select 3 credits in arts and humanities	—	x
<b>SOCIAL SCIENCES (3 credits)</b>		
Select 3 credits in social sciences	—	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>		
CMPSC 101(3)	x	—

**REQUIREMENTS FOR THE MAJOR: 47-48 credits**

<b>PRESCRIBED COURSES (42 credits)</b>		
E G 001(2), PHYS 150(3), EE T 801(4), 805(1), 809(1), 810(3), 814(3), 818(2)	x	—
EE T 811(3), 817(4), 820(1), PHYS 151(3), MCMP 840(5), 841(4), 842(3)	—	x
<b>ADDITIONAL COURSES (5-6 credits)</b>		
Select 2-3 credits from the following technical courses: BI SC 003, CHEM 011, 012, CE T 861, CMPSC 102, EE T 830, E G 003, 803, 830, E MCH 813, IE T 315, 805, MATH 140, 141, 231, ME T 800, 807	—	x
Select 3 credits in computer science	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

## MINING TECHNOLOGY (2MNGT)

A student in the Mining Technology major covers a blend of basic sciences, mathematics, communications, humanities and social sciences, and applied courses during the period of study. These courses are sequenced so that basic principles of physical processes are used to understand the specific procedures involved in mining. The curriculum covers a breadth of material at a level consistent with potential careers of mining technology graduates.

This major prepares students for either a management-oriented or an engineering-oriented position in the mining industry. Many graduates of this major, after serving the required apprenticeship, become certified managers in their fields.

The Maintenance option prepares a student to become a maintenance supervisor. Initially, the graduate may work as an apprentice electrician or mechanic to gain experience in repairs and planned maintenance. After certification is obtained, the graduate may become involved with maintenance planning, working as or with the chief mine mechanic or chief mine electrician.

The Production option prepares a student to become a mine foreman or an engineering aide. Initially, some of the duties are to run transit and act as survey party chief, keep mine maps up-to-date and make projections, take samples and run analyses, make time studies, and assist with materials handling layouts.

The Surface Mining option prepares a student for work as an engineering aide or as a supervisor in surface mining. At first, the graduate works as an assistant to engineers or to other supervisors. After a period of training, the graduate may become involved in such areas of mining as pit

design, equipment utilization, environmental control, reclamation, and mine laws and regulations.

Graduates of the Mining Technology major may qualify for admission to the baccalaureate degree majors in Energy Technology or in Structural Design and Construction Engineering Technology offered at the Capitol Campus.

For the Associate in Engineering degree in Mining Technology, 72 credits are required.

*Scheduling Recommendation  
by Semester Standing*  
1-2                      3-4

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**GENERAL DEGREE REQUIREMENTS: 23 credits**

---

**COMMUNICATIONS (6 credits)**

ENGL 015(3)

x

—

SPCOM 100(3)

—

x

**QUANTIFICATION AND NATURAL SCIENCES (8 credits)**

MATH 807(5), CHEM 011(3)

x

—

**ARTS AND HUMANITIES (3 credits)**

Selection from University list (3)

—

x

**SOCIAL SCIENCES (3 credits)**

ECON 014(3)

x

—

**GENERAL EDUCATION SELECTION (3 credits)**

GEOSC 001 or 020(3)

x

—

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**REQUIREMENTS FOR THE MAJOR: 49 credits**

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**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 25 credits**

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**PRESCRIBED COURSES (25 credits)**

CMPSC 101(3), E G 001(2), E MCH 811(3), MATH 808(4),

PHYS 150(3)

x

—

MNG T 800(1), 804(3), 806(3)

x

x

ENGL 826(3)

—

x

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**REQUIREMENTS FOR THE OPTION: 24 credits**

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**MAINTENANCE OPTION: 24 credits**

**PRESCRIBED COURSES (24 credits)**

MGMT 100(3), MNG T 801(3), 802(3), 807(3), 808(3),  
809(3), 810(3), 811(3)

—

x

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**PRODUCTION OPTION: 24 credits**

**PRESCRIBED COURSES (21 credits)**

MN PR 061(3), MNG 023(3), 030(3), MNG T 801(3),  
802(3), 803(3), 805(3)

—

x

**SUPPORTING COURSES AND RELATED AREAS (3 credits)**

Select 3 credits in mining technology

—

x

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**SURFACE MINING OPTION: 24 credits**

**PRESCRIBED COURSES (21 credits)**

MN PR 061(3), MNG 023(3), MNG T 815(3), 816(3),  
817(3), 818(3), 819(3)

—

x

**SUPPORTING COURSES AND RELATED AREAS (3 credits)**

Select 3 credits in mining technology

—

x

NUCLEAR ENGINEERING TECHNOLOGY (2 NET)

The Nuclear Engineering Technology major is designed to provide technically trained personnel to support the rapidly developing nuclear industry. The wide scope of training prepares the nuclear technician for careers in radiation safety, reactor operations, radioisotope handling, nuclear and control instrumentation, fuel fabrication, and health physics. A nuclear technician may work as a radiological safety specialist, engineering aide, or enter training as a reactor operator at a nuclear facility.

Graduates of the Nuclear Engineering Technology major may qualify for admission to the baccalaureate degree majors in Electrical Engineering Technology or in Energy Technology offered at the Capitol Campus. Or they may qualify for admission to the Instrumentation and Controls option of the baccalaureate degree major in Energy and Environmental Technology offered at the Behrend College.

For the Associate in Engineering degree in Nuclear Engineering Technology, 70 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015*(3)	x	—
SPCOM 100(3)	--	x
QUANTIFICATION AND NATURAL SCIENCES (9 credits)		
MATH 807(5), 808(4)	x	—
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
CMPS 101(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 46 credits</b>		
PRESCRIBED COURSES (46 credits)		
ENGL 826(3), EE T 801(4), 809(1), 814(3), E G 001(2)	—	x
CHEM 011(3), PHYS 150(3), 151(3)	x	x
ME T 807(3), NE T 801(2), 802(4), 805(3)	—	x
NE T 803(3), 804(3), 812(3), 814(3)	—	x¶

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015. ENGL 218 or 826 is required for all students in the program.

¶To be taken at University Park Campus.

PHYSICAL THERAPIST ASSISTANCE (2 PTA)

The Physical Therapist Assistance major is designed to provide an opportunity for interested students to develop knowledge and skills in the principles of physical therapy techniques, appropriate use of equipment associated with various physical therapy treatment modalities, and the basic diagnostic approaches necessary for adequate rehabilitation programming efforts. In order to accomplish these tasks, the major utilizes a combination of basic science and nonscience course work coupled with appropriate clinical experiences.

To enter this major, students must have a high school diploma and satisfactory Scholastic Aptitude Test scores. The size of each entering class must be limited to ten students so that

optimal clinical experiences and practical application situations can be maintained. Close, personal supervision is essential for total program integrity.

For the Associate in Science degree in Physical Therapist Assistance, 67 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	3-4	5
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 004 or 015(3)	x	—	—
SPCOM 100A(3)	—	x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)			
MATH 005 or 017(3); BI SC 001, 002, or 003(3)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in humanities	—	x	—
SOCIAL SCIENCES (3 credits)			
SOC 001(3)	—	x	—
GENERAL EDUCATION SELECTION (3 credits)			
ENGL 015, 201, or 218(3)	x	x	—
<b>REQUIREMENTS FOR THE MAJOR: 46 credits</b>			
PRESCRIBED COURSES (45 credits)			
BIOL 029(4), HL ED 800¶(3), 807(1), PH SC 007(3), PSY 002(3)	x	—	—
BIOL 041(3), 042(1), HL ED 384(3), 801(4), 803(3), 804(3)	—	x	—
HL ED 802(1), 805(2), 806¶(10), 808(1)	—	—	x
SUPPORTING COURSES AND RELATED AREAS (1 credit)			
Select 1 credit in HL ED or PH ED	x	—	—

¶Courses that include clinical education experiences may require the student to travel long distances or obtain housing near the assigned clinic. Housing and transportation arrangements are the responsibility of the student.

## RAILWAY ENGINEERING TECHNOLOGY (2 RET)

The objective of the Railway Engineering Technology major is to prepare railway technicians for the revitalized railway industry. Such individuals will be able to run surveys, solve right-of-way and drainage problems, deal with track layout and maintenance problems, and work with basic railway structures. Graduates of the Railway Engineering Technology major may find employment as track foremen, track supervisors, track inspectors, or management trainees with the American railroads; as track inspectors with the Federal Railroad Administration; or as designers and estimators with consulting engineers.

Graduates of the Railway Engineering Technology major may qualify for admission to the baccalaureate degree major in Structural Design and Construction Engineering Technology offered at the Capitol Campus.

For the Associate in Engineering degree in Railway Engineering Technology, 68-69 credits are required.



	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>			
COMMUNICATIONS (6 credits)			
ENGL 015*(3)	x	—	—
SPCOM 100(3)	—	—	x
QUANTIFICATION AND NATURAL SCIENCES (9 credits)			
MATH 807(5), 808(4)	x	—	—
ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	—	—	x
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	—	x
GENERAL EDUCATION SELECTION (3 credits)			
CMPSC 101(3)	x	—	—
<b>REQUIREMENTS FOR THE MAJOR: 44-45 credits</b>			
PRESCRIBED COURSES (42 credits)			
CE T 809(2), 811(3), 812(3), 818(2), E G 001(2), PHYS 150(3), 151(3)	x	—	x
CE T 813(4)	—	x	—
CE T 840(3), 841(3), 842(3), 843(3), EE T 800(2), E MCH 811(3), 813(3)	—	—	x
ADDITIONAL COURSES (2-3 credits)			
Select 2-3 credits from the following technical courses: CE T 822, 823, 824, 825, 830, 861, CHEM 011, 012, CMPSC 102, EE T 800, E G 803, 830, I E 315, 805, MATH 140, 141, 231, ME T 800, or 807	—	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

## SCIENCE (2 SC)

The Science major is primarily designed to provide for the basic educational needs of students who want to pursue professional programs in various medically related fields. The major provides a group of basic science courses that are valuable to those students seeking positions in government or industry where such knowledge is necessary or desirable.

The Radiologic Technologist Radiographer option requires seven semesters (five semesters and two summer sessions) of formal classroom and clinical education. In the clinical practicum, the student is required to demonstrate competency in performing examinations under supervision in the radiology department of a participating hospital. This generally requires between 1800 and 2400 clock hours. In addition to receiving the Associate in Science degree, the student who successfully completes the major is eligible to take the American Registry of Radiologic Technologists (ARRT) examination for certification.

Graduates of the General option of the Science major may qualify for admission to the baccalaureate degree major in Mathematical Sciences offered at the Capitol Campus.

For the Associate in Science degree in Science, 66 credits are required.

*Scheduling Recommendation  
by Semester Standing*

	1-2	3-4	5-6	7
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**GENERAL DEGREE REQUIREMENTS: 21 credits**


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**COMMUNICATIONS (6 credits)**

ENGL 015(3), SPCOM 100(3)	x	x	—	—
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**QUANTIFICATION AND NATURAL SCIENCES (6 credits)**

CHEM 011(3)	x	—	—	—
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Select 3 credits in mathematics (MATH 005 recommended for Radiologic Technologist Radiographer option; MATH 007 recommended for General option)

	x	—	—	—
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**ARTS AND HUMANITIES (3 credits)**

	—	x	—	—
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**SOCIAL SCIENCES (3 credits)**

	x	x	—	—
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**GENERAL EDUCATION SELECTION (3 credits)**

Select 3 credits in social and behavioral sciences

	x	x	—	—
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**REQUIREMENTS FOR THE MAJOR: 45-53 credits****COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 17 credits****PRESCRIBED COURSES (17 credits)**

BIOL 029(4), 101(4), PHYS 150(3)	x	—	—	—
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BIOL 041(3), PHYS 151(3)	—	x	—	—
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**REQUIREMENTS FOR THE OPTION: 28-36 credits****GENERAL OPTION: 28 credits****PRESCRIBED COURSES (10 credits)**

MATH 110(4)	x	—	—	—
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CMPSC 101(3), MICRB 106(2), 107(1)	—	x	—	—
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**ADDITIONAL COURSES (15 credits)**

CHEM 034 or BIOCH 001(3)	—	x	—	—
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Select 12 credits from the following biological, mathematical, and physical science courses:

ASTRO 001(3), BIOL 033(3), 042(1), 102(4),

BI SC 003(3), CHEM 035(3), 102(3), MATH 111(2),

PHIL 212(3), PHYS 297(3), or STAT 200(4)	x	x	—	—
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**SUPPORTING COURSES AND RELATED AREAS (3 credits)**

Select 3 credits from arts and humanities	x	x	—	—
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**RADIOLOGIC TECHNOLOGIST RADIOGRAPHER OPTION: 36 credits****PRESCRIBED COURSES (36 credits)**

BIOL 033(3), CMPSC 100(3), HUMAN 101(3),				
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MATH 006(3), PHYS 297(3), R T R 101(3), 102(3)	x	—	—	—
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R T R 103(3), 104(3)	—	x	—	—
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R T R 105(3), 106(3)	—	—	x	—
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R T R 107(3)	—	—	—	x
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SOCIOLOGY (2ESOC)

The Sociology major introduces students to the study of human groups and their relationships to each other and to the environment. It enables students to gain some proficiency in the scientific study of group structures and processes. A further objective is to help students become more skillful in working with community institutions, agencies, and organizations either through gainful employment or as a volunteer.

Graduates of the Sociology major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Humanities, or Public Policy offered at the Capitol Campus.

For the Associate in Arts degree in Sociology, 60 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 21 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015(3), SPCOM 100(3)	x	—
QUANTIFICATION AND NATURAL SCIENCES (6 credits)	x	x
ARTS AND HUMANITIES (3 credits)	x	x
SOCIAL SCIENCES (3 credits) (Not to include Sociology)	x	x
GENERAL EDUCATION SELECTION (3 credits) Select 3 credits in any of the areas above to be determined by the department	x	x
<b>REQUIREMENTS FOR THE MAJOR: 39 credits</b>		
PRESCRIBED COURSES (6 credits)		
SOC 001(3)	x	—
SOC 007(3)	—	x
ADDITIONAL COURSES (12 credits) Select 12 credits from SOC 003, 005, 012, 013, 015, 023, 030, 047, or 055	x	x
SUPPORTING COURSES AND RELATED AREAS (12 credits) Select 12 credits in arts, humanities, social and behavioral sciences	x	x
ELECTIVES (9 credits)	x	x

SOLAR AND THERMAL TECHNOLOGY (2SOLR)

The Solar and Thermal Technology major prepares engineering technicians for the expanding thermal, solar, and related industries. Students will be able to help design, specify, test, and supervise installation and to make cost estimates for residential and commercial heating and cooling systems using recognized standard components, with special emphasis on solar applications.

Graduates from the Solar and Thermal Technology major may qualify for admission to the baccalaureate degree majors in Energy Technology or in Structural Design and Construction Engineering Technology offered at the Capitol Campus. Or they may qualify for admission to the Instrumentation and Controls option of the baccalaureate degree major in Energy and Environmental Technology offered at the Behrend College.

For the Associate in Engineering degree in Solar and Thermal Technology, 68 credits are required.

	<i>Scheduling Recommendation by Semester Standing</i>	
	1-2	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>		
COMMUNICATIONS (6 credits)		
ENGL 015*(3)	x	—
SPCOM 100(3)	—	x
QUANTIFICATION AND NATURAL SCIENCES (9 credits)		
MATH 807(5), 808(4)	x	—
ARTS AND HUMANITIES (3 credits)		
Select 3 credits in arts or humanities	—	x
SOCIAL SCIENCES (3 credits)		
Select 3 credits in social sciences	—	x
GENERAL EDUCATION SELECTION (3 credits)		
CMPS 101(3)	x	—
<b>REQUIREMENTS FOR THE MAJOR: 44 credits</b>		
PRESCRIBED COURSES (38 credits)		
AE T 801(2), 802(2), EE T 800(2), E G 001(2), ME T 881(4), PHYS 150(3), S T 801(2)	x	—
AE T 803(3), 804(3), PHYS 151(3), S T 804(3), 807(3), 808(3), 809(3)	—	x
ADDITIONAL COURSES (6 credits)		
Select 6 credits from the following technical courses: AE T 807, 809, 810, 814, 815, 830, CMPS 102, CHEM 011, 012, E G 803, 830, E MCH 811, 812, 813, MATH 140, 141, 231, 250, S T 806, or 830	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

SURVEYING TECHNOLOGY (2 SRT)

The objectives of the Surveying Technology major are to provide a knowledge of the elements of surveying as applied to construction, land, topographic, geodetic, city, and photogrammetric surveys, and to develop trained personnel who understand the relation between the precision of measurements and the interpretation of data in addition to having an appreciation of the skills and equipment needed to make precise measurements in the field of surveying.

Graduates of the Surveying Technology major may qualify for admission to the baccalaureate degree major in Structural Design and Construction Engineering Technology offered at the Capitol Campus.

For the Associate in Engineering degree in Surveying Technology, 69-70 credits are required.



## TELECOMMUNICATIONS TECHNOLOGY

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
<b>GENERAL DEGREE REQUIREMENTS: 24 credits</b>			
<b>COMMUNICATIONS (6 credits)</b>			
ENGL 015*(3)	x	—	—
SPCOM 100(3)	—	—	x
<b>QUANTIFICATION AND NATURAL SCIENCES (9 credits)</b>			
MATH 807(5), 808(4)	x	—	—
<b>ARTS AND HUMANITIES (3 credits)</b>			
Select 3 credits in arts or humanities	—	—	x
<b>SOCIAL SCIENCES (3 credits)</b>			
Select 3 credits in social sciences	—	—	x
<b>GENERAL EDUCATION SELECTION (3 credits)</b>			
CMPS 101(3)	x	—	—
<b>REQUIREMENTS FOR THE MAJOR: 45-46 credits</b>			
<b>PRESCRIBED COURSES (43 credits)</b>			
CE T 809(2), 811(3), 812(3), 818(2), E G 001(2), ENGL 826(3)	x	—	—
PHYS 150(3), 151(3)	x	—	x
CE T 813(4)	—	x	—
CE T 810(3), 814(3), 815(3), 816(3), 817(2), 890(2), E G 012(2)	—	—	x
<b>ADDITIONAL COURSES (2-3 credits)</b>			
Select 2-3 credits from the following technical courses: CE T 822, 823, 824, 825, 830, 840, 841, 861, CHEM 011, 012, CMPS 102, EE T 800, E G 003, 803, 830, E MCH 810, 811, I E 315, IE T 805, MATH 140, 141, 231, or ME T 800	—	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 must take ENGL 015. ENGL 218 or 826 is required for all students in the program.

## TELECOMMUNICATIONS TECHNOLOGY (2TELT)

The field of telecommunications includes the transmission of voice and digital signals by telephone, telegraph, radio, television, and satellite. Graduates of the Telecommunications major will be engineering technicians who help select, design, install, operate, maintain, troubleshoot, and repair modern telecommunications systems. Future uses for telecommunications systems include electronic mail, electronic shopping, home computer terminal tie-ins, remote utility meter reading, and the transmission of biomedical data between hospitals, libraries, and doctors' offices.

Graduates of the Telecommunications Technology major may qualify for admission to the baccalaureate degree major in Electrical Engineering Technology offered at the Capitol Campus. Or they may qualify for the Instrumentation and Controls option of the baccalaureate degree major in Energy and Environmental Technology offered at the Behrend College.

For the Associate in Engineering degree in Telecommunications Technology, 70 credits are required.

*Scheduling Recommendation  
by Semester Standing*

	1-2	3-4
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**GENERAL DEGREE REQUIREMENTS: 24 credits****COMMUNICATIONS (6 credits)**

ENGL 015*(3)	x	—
SPCOM 100(3)	—	x

**QUANTIFICATION AND NATURAL SCIENCES (9 credits)**

MATH 807(5), 808(4)	x	—
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**ARTS AND HUMANITIES (3 credits)**

Select 3 credits in arts or humanities	—	x
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**SOCIAL SCIENCES (3 credits)**

Select 3 credits in social sciences	—	x
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**GENERAL EDUCATION SELECTION (3 credits)**

CMPS 101(3)	x	—
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**REQUIREMENTS FOR THE MAJOR: 46 credits****PRESCRIBED COURSES (46 credits)**

EE T 801(4), 805(1), 809(1), 810(3), 814(3), 818(2), E G 001(2), PHYS 150(3)	x	—
EE T 811(3), 816(3), 817(4), 820(1), 821(1), IE T 805(2), PHYS 151(3), TELCM 840(2), 841(3), 842(1), 843(3), 844(1)	—	x

\*Students are placed in ENGL 004 or 015 on the basis of English Placement Test scores. Students who are placed in ENGL 004 also must take ENGL 015 or 826. Students who begin with ENGL 015 are encouraged to take ENGL 218 or 826.

## WILDLIFE TECHNOLOGY (2WLT)

The Wildlife Technology major prepares students in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and the care, maintenance, and propagation of animals. Graduates should be able to support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research.

For the Associate in Science degree in Wildlife Technology, 66 credits are required.

*Scheduling Recommendation  
by Semester Standing*

	1-2	Summer	3-4
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**GENERAL DEGREE REQUIREMENTS: 21 credits****COMMUNICATIONS (6 credits)**

ENGL 015(3)	x	—	—
SPCOM 100(3)	—	—	x

**QUANTIFICATION AND NATURAL SCIENCES (6 credits)**

MATH 807(3)	x	—	—
Select 3 credits in quantification or natural sciences*	—	—	x

\*Students may select course work in biology, computer science, or earth sciences in consultation with a faculty adviser.

	<i>Scheduling Recommendation by Semester Standing</i>		
	1-2	Summer	3-4
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ARTS AND HUMANITIES (3 credits)			
Select 3 credits in arts or humanities	x	—	—
<hr/>			
SOCIAL SCIENCES (3 credits)			
Select 3 credits in social sciences	—	—	x
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GENERAL EDUCATION SELECTION (3 credits)			
ENGL 218(3)	—	—	x
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REQUIREMENTS FOR THE MAJOR: 45 credits			
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PREScribed COURSES (45 credits)			
CE T 809(2), FOR 240(3), 242(3), 250(3), WILDL 101(3), 103(3), 802(3)	x	—	—
WILDL 805(3), 806(2)	—	x	—
HL ED 013(1), WILDL 204(3), 207(3), 208(3), 209(3), 211(4), 213(3)	—	—	x

# COURSE DESCRIPTIONS

## CREDITS AND HOURS

Credits are awarded on the semester-hour basis. According to Senate Policy 42-23, a total of at least forty hours of work planned and arranged by the University faculty is required for the average student to gain 1 credit. While the distribution of time varies from course to course, generally, one-third of the time is devoted to formal instruction, such as lecture, recitation, laboratory, field trips, etc., and two-thirds of the time to outside preparation.

Credits, classroom work, and practicum or laboratory work are indicated by three numbers in parentheses immediately following the course title—for example (3:3:0):

1. The first number shows the maximum credits authorized for the course.
2. The second number shows the periods of classroom work (including lecture, recitation, class discussion, demonstration, or various combinations of these).
3. The third number shows the periods of practicum work (including laboratory, shop work, studio, drafting room, field trips, etc.).

A typical period is fifty minutes.

Courses numbered from 800 to 899 are reserved for the associate degree majors. Credit received for 800-series courses may be applicable to a particular baccalaureate degree program offered by the University at the discretion of the appropriate college and major department. Courses numbered from 1 to 399 carry baccalaureate credit and are required in most of the associate degree majors. Elective credit courses vary from campus to campus and semester to semester, and all of the courses listed below are not offered at each campus. Students may obtain information about the specific course offerings for a given campus from the appropriate *Schedule of Classes*.

## ACCOUNTING (ACCTG)

016. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Accounting for proprietorships, partnerships, and corporations for retailers and manufacturers; financial statement analysis. Students who have passed ACCTG 101 may not schedule this course.

101. INTRODUCTORY FINANCIAL ACCOUNTING (3:2½:1) Fundamentals of the collection, recording, summarization, and interpretation of accounting data.

104. INTRODUCTORY MANAGERIAL ACCOUNTING (3:2½:1) Actual and standard cost systems; managerial uses of cost data. Prerequisite: ACCTG 101.

801. INTRODUCTORY ACCOUNTING (3:2:1)

802. INTRODUCTORY ACCOUNTING (3:2:1) Prerequisite: ACCTG 801.

803. INTERMEDIATE ACCOUNTING (3:3:0) Financial accounting statements, concepts, and procedures; assets, liabilities, owners' equity, statement analysis. Prerequisite: ACCTG 802.

806. FEDERAL TAX ACCOUNTING (3:3:0) Federal tax revenue system as it affects the individual and business; tax planning, research, and preparation of returns. Prerequisite: ACCTG 802.

807. MANAGERIAL ACCOUNTING (3:3:0) Cost and budgetary control; preparation of information for decision making. Prerequisite: ACCTG 802.

810. INTRODUCTION TO FEDERAL TAX PREPARATION (1:1:0) Preparation of tax returns for low-income and elderly individuals in cooperation with the IRS Volunteer Income Tax Assistance Program. Prerequisite: ACCTG 101 or 802.

816. INTRODUCTORY ACCOUNTING SURVEY (3:3:0) Fundamentals of accumulation and summarization of accounting data; emphasis on financial statement analysis and the uses of accounting in business.



## **ADMINISTRATION OF JUSTICE (ADM J)**

111. INTRODUCTION TO THE AMERICAN CRIMINAL JUSTICE SYSTEM (3:3:0) Criminal justice systems, including formulation of laws, extent of crime, processing and correction of offenders, victims.

221. ISSUES IN THE AMERICAN CRIMINAL JUSTICE SYSTEM (3:3:0) Examination of the models of the criminal process, functions of the justice system, and approaches to crime and punishment. Prerequisite: ADM J 111.

240. FIELD RESEARCH IN THE ADMINISTRATION OF JUSTICE (1:1:0) Field research strategies appropriate to the investigation of research questions in the administration of justice. Prerequisite: ADM J 111.

241. APPLICATION OF FIELD RESEARCH IN ADMINISTRATION OF JUSTICE (2:0:4) The use of observational research strategies in identifying and analyzing issues in the administration of justice. Prerequisite: ADM J 240.

394. INTRODUCTION TO FIELD WORK IN ADMINISTRATION OF JUSTICE (1:1:0) Planning and preparation for field experience in an administration of justice agency setting. Prerequisites: ADM J 221, 240.

395. FIELD WORK IN ADMINISTRATION OF JUSTICE (13:0:26) Field experience focusing on the student's major interest within the administration of justice. Prerequisite: ADM J 394.

396. POST FIELD WORK SEMINAR IN ADMINISTRATION OF JUSTICE (1:1:0) Examination of concepts, critical issues, processes, and procedures which are useful in explaining and understanding the field internship experience. Prerequisite: ADM J 395.

## **AGRICULTURAL ECONOMICS (AG EC)**

101. INTRODUCTION TO AGRICULTURAL ECONOMICS (3:3:0) Application of economic principles to resource allocation problems in the production, marketing, and consumption of food and agricultural products. Not open to students in the Agricultural Economics and Rural Sociology or Agricultural Business Management major or students who have completed ECON 302.

102. INTRODUCTION TO FOOD AND AGRICULTURAL MARKETING (3:3:0) Comprehensive theoretical and descriptive survey of farm and food products marketing from the perspective of producers, marketing middlemen, and consumers.

106. INTRODUCTION TO FARM MANAGEMENT (3:3:0) Organizing and operating farm businesses for financial success; measuring profits; improving efficiency of labor, land, capital; getting started in farming.

## **AMERICAN STUDIES (AM ST)**

100. INTRODUCTION TO AMERICAN STUDIES (3:3:0) A study of selected attempts to identify and interpret movements and patterns in American culture. Prerequisite: third-semester standing.

105. AMERICAN POPULAR CULTURE AND FOLKLIFE (3:3:0) Survey of popular culture, folklife, and ethnicity, synthesizing material from such areas as literature, media, entertainment, print, music, and film.

## **ANTHROPOLOGY (ANTHY)**

001. INTRODUCTORY ANTHROPOLOGY (3:3:0) Prehistoric and traditional peoples and cultures; traditional customs and institutions compared with those of modern society.

045. CULTURAL ANTHROPOLOGY (3:3:0) Beginnings of human culture; economic life, society, government, religion, and art among traditional peoples.

## ARCHITECTURAL ENGINEERING TECHNOLOGY (AE T)

801. **BUILDING MATERIALS (3:3:0)** Structural and architectural use of building materials and construction assemblies.
802. **METHODS OF CONSTRUCTION (3:1:5)** Materials and methods of construction used in buildings, as expressed in drawings. Prerequisite or concurrent: AE T 801, E G 001.
803. **PLUMBING AND FIRE PROTECTION (3:2:2)** Layout of plumbing and fire protection in buildings to meet code and usage requirements. Prerequisite or concurrent: AE T 802.
804. **HEATING, VENTILATING, AND AIR CONDITIONING LAYOUT (3:2:2)** Fundamental calculations and layout of systems in buildings. Prerequisite: AE T 803. Or concurrent: AE T 802.
806. **ARCHITECTURAL PRESENTATION (2:1:2)** Visual communication through architectural presentation drawings. Line, value, color, and composition. Prerequisite: E G 001 or 003.
807. **ADVANCED CONSTRUCTION METHODS (3:1:5)** Integration of materials and systems in working drawings. Prerequisite: fourth-semester standing.
809. **STRUCTURE DESIGN (3:2:3)** Elementary principles of structural design and detailing in timber, steel, and reinforced concrete; use of handbooks; fundamentals of structural and architectural drafting. Prerequisites: E MCH 813; AE T 802 or E G 803.
810. **ARCHITECTURAL ENGINEERING OFFICE PRACTICE (3:3:0)** Procedures involved in production of contract documents, both drawings and specifications. Prerequisite: fourth-semester standing.
812. **BUILDING LIGHTING AND ELECTRICAL LAYOUT (3:2:2)** Layout of lighting and electrical distribution in buildings.
813. **SITE PLANNING (2:1:2)** Energy conservation through optimum site utilization, contours, cut and fill calculations, storm drainage, spot grading, and finish grading.
814. **STEEL CONSTRUCTION (3:2:2)** Strength of materials as applied to the design of simple steel structures. Prerequisites: AE T 802, E MCH 811.
815. **CONCRETE CONSTRUCTION (3:2:2)** Fundamentals of design and construction of reinforced concrete structures. Prerequisites: AE T 802, E MCH 811.
830. **SELECTED TOPICS IN ARCHITECTURAL ENGINEERING TECHNOLOGY (3)** Individual or group work in architectural engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## ART (ART)

110. **DESIGN: TWO DIMENSIONAL (3:2:4)** Introduction to design in two dimensions. Pictorial space and the principles of visual organization of the flat surface.
111. **DESIGN: THREE DIMENSIONAL (3:2:4)** Introduction to design in three dimensions. Principles of visual organization in working with actual space and volume.
120. **INTRODUCTION TO DRAWING (3:2:4)** The study and practice of basic drawing as a way of understanding and communicating.
121. **DRAWING: TECHNIQUES, MATERIALS, AND TOOLS (3:2:4)** Drawing with an emphasis on organization and the development of drawing skills through a variety of techniques, materials, and tools. Prerequisite: ART 120.
180. **CERAMIC ARTS (3:2:4)** Introduction to potter's wheel techniques; experiments with decorative application; includes the technical concerns for clay, glazes, and kilns. For non-Art majors.
280. **INTRODUCTORY CERAMIC ARTS (3:2:4)** The fundamentals of ceramics, throwing, hand-building, and glazing; acquainting the student with ceramic materials, techniques, and philosophy. Prerequisite: 2 credits in studio art.
296. **INDEPENDENT STUDIES (1-18)**

## **ART EDUCATION (A ED)**

014. **INTRODUCTORY CRAFTS FOR TEACHERS (3:1:5)** Direct experience with materials such as wood, clay, metal, paper, textiles, and plastics in relationship to the creative needs of children.

## **ART HISTORY (ART H)**

100. **INTRODUCTION TO ART (3:3:0)** An approach to the understanding of art through a critical analysis of selected works of architecture, painting, and sculpture. Students who have passed ART H 110 may not schedule this course.

110. **SURVEY OF WESTERN ART (3:3:0)** General survey of major developments in architecture, painting, and sculpture in the Western world. Students who have passed ART H 100 may not schedule this course.

111. **SURVEY OF WESTERN ART I (3:3:0)** Survey of the major monuments and trends in the history of art from prehistory through the late Gothic period. Students who have passed ART H 110 may not schedule this course.

112. **SURVEY OF WESTERN ART II (3:3:0)** Survey of the major monuments and trends in the history of art from the Renaissance to the modern era. Students who have passed ART H 110 may not schedule this course.

214. **MODERN ARCHITECTURE (3:3:0)** Architecture and related arts of sculpture and painting from the end of the eighteenth century to the present day. Nontechnical in nature.

305. **EUROPEAN ART FROM 1780-1860 (3:3:0)** A survey of painting and sculpture in Europe from the beginnings of Neoclassicism through the Realist movement. Prerequisite: ART H 100 or 110 or 112.

307. **AMERICAN ART (3:3:0)** History of art in the English colonies and the United States from the seventeenth century to the present.

## **THE ARTS (ARTS)**

001. **THE ARTS (3:3:0)** Developing perception in the arts through relating the visual, musical, performing, and environmental arts.

## **ASTRONOMY (ASTRO)**

001. **ASTRONOMICAL UNIVERSE (3:3:0)** Nonmathematical description of the astronomical universe and the development of scientific thought. For nonscience majors. Students who have passed ASTRO 090 may not schedule this course.

010. **MAN AND UNIVERSE (2:2:0)** Nonmathematical description of stars, planets, galaxies, and the universe. For nonscience majors. Students who have passed ASTRO 001 or 090 may not schedule this course.

## **BIOCHEMISTRY (BIOCH)**

001. **BIOCHEMICAL SCIENCE (3:3:0)** Biochemistry of important functions of man and animals, including genetics, nutrition, metabolic and disease processes, and environmental relationships.

## **BIOLOGICAL SCIENCE (BI SC)**

001. **STRUCTURE AND FUNCTION OF ORGANISMS (3:3:0)** Origin, development, and cellular basis of life; fundamental principles, processes, and structures of organisms. Students who have passed BIOL 027, 041, 101, or 102 may not schedule this course.

002. **GENETICS, ECOLOGY, AND EVOLUTION (3:3:0)** How living organisms pass on their inher-



itance, how plants and animals came to be what they are, and how they now react. Students who have passed BIOL 033, 101, 102, or 222 may not schedule this course.

003. **MAN AND HIS ENVIRONMENT (3:3:0)** Kinds of environments; past and present uses and abuses of natural resources; disposal of man's wastes; prospects for the future. Students who have passed BIOL 210 or any other upper-level ecology course in biology may not schedule this course.

004. **BIOLOGY OF MAN (3:3:0)** A general survey of structure and function in man—from conception, through growth and reproduction, to death. Students who have passed BIOL 029 and 041 may not schedule this course.

## **BIOLOGY (BIOL)**

027. **INTRODUCTION TO PLANT BIOLOGY (3:2:2)** Cellular structure and organization; physiological processes; classification; reproduction and development; relationship of plant groups. Students who have passed BIOL 102 may not schedule this course.

029. **MAMMALIAN ANATOMY (4:2:4)** Anatomy of a mammal, with special reference to that of man. Students who have passed BIOL 421 may not schedule this course.

033. **HUMAN GENETICS (3:3:0)** Human heredity and its individual and social implications. Students who have passed BIOL 222 may not schedule this course.

041. **PHYSIOLOGY (3:3:0)** Normal functions of the animal body, with special reference to those of man. Students who have passed BIOL 472 may not schedule this course.

042. **PHYSIOLOGY LABORATORY (1:0:2)** Experiments demonstrating basic physiological principles, with special reference to man. Prerequisite or concurrent: BIOL 041.

101. **PRINCIPLES OF BIOLOGY I (4:3:2)** Introduction to cell biology; biology of vertebrates; overview of monerans, protists, and animals.

102. **PRINCIPLES OF BIOLOGY II (4:3:2)** Continuation of BIOL 101, with emphasis on plants and fungi; genetics of organisms and populations; evolution. Prerequisite: BIOL 101.

## **BIOMEDICAL EQUIPMENT TECHNOLOGY (B E T)**

801. **PHYSIOLOGICAL TRANSDUCERS (5:4:2)** Study of the principles of operation and applications of devices used for the conversion of physiological events to electrical signals. Prerequisite: EE T 810.

802. **BIOMEDICAL INSTRUMENTATION AND SYSTEMS (5:4:2)** Introduction to the operating principles, calibration, and maintenance of biomedical instruments and systems with special emphasis given to patient safety. Prerequisite: B E T 801.

803. **BIOMEDICAL EQUIPMENT LABORATORY (Internship) (4:1:6)** Practical experience, within or related to the hospital environment, on a variety of biomedical instruments. Prerequisites: B E T 804, BIOL 041.

804. **MEDICAL AND CLINICAL EQUIPMENT (3:2:2)** Principles of operation of clinical, medical radiography, intensive care, anesthesia, respiratory, non-invasive imaging, and emergency equipment; hospital electrical safety. Prerequisite: B E T 801.

830. **SELECTED TOPICS IN BIOMEDICAL EQUIPMENT TECHNOLOGY (3)** Individual or group work in biomedical equipment technology for students with specific occupational objectives. Prerequisite: third-semester standing.

## **BUSINESS ADMINISTRATION (B A)**

250. **PROBLEMS OF SMALL BUSINESS (3:3:0)** Analysis of problems of the small firm, particularly for the student who wishes to venture into business. Prerequisite: 3 credits in economics.

803. **COOPERATIVE PRACTICUM WITH BUSINESS OFFICES (3-6)** Cooperative practical work with business offices under the supervision of the instructor.



## **BUSINESS LAW (B LAW)**

243. **LEGAL ENVIRONMENT OF BUSINESS (3:3:0)** Social control through law: courts, basic policies underlying individual and contractual rights in everyday society. Prerequisite: third-semester standing.
850. **REAL ESTATE LAW (3:3:0)** Basic legal principles involved in the negotiation of real estate transactions.

## **BUSINESS LOGISTICS (B LOG)**

301. **BUSINESS LOGISTICS MANAGEMENT (3:3:0)** Management of logistics function in firm, including physical supply and distribution activities such as transportation, storage facility location, and materials handling. Prerequisite: third-semester standing.
304. **TRANSPORT SYSTEMS (3:3:0)** Conceptual model of a transport system; environmental relationships; modal components and managerial conditions, with special application to the United States. Prerequisite: B LOG 301.
305. **TRAFFIC MANAGEMENT (3:3:0)** Analysis of the traffic function in the logistics system. Evaluation of routes, rates, and shipping document procedures. Prerequisite: B LOG 301 or 304.

## **CHEMICAL ENGINEERING TECHNOLOGY (CH ET)**

810. **CHEMICAL TECHNOLOGY (4:4:0)** Industrial stoichiometry, material balances, heats of reaction. Prerequisite or concurrent: CHEM 013, 015.
811. **CHEMICAL TECHNOLOGY (5:5:0)** Fluid flow, heat transfer, evaporation, distillation, air-water interaction. Prerequisite: CH ET 810.
821. **CHEMICAL TECHNOLOGY LABORATORY (2:1:2)** Measurements in stoichiometry, material balances, and heats of reaction; industrial laboratory report writing. Prerequisite or concurrent: CH ET 810.
822. **CHEMICAL TECHNOLOGY LABORATORY (2:1:2)** Measurements in fluid flow, heat transfer, distillation, mass transfer; chemical analytical techniques. Prerequisite or concurrent: CH ET 811.
830. **INDUSTRIAL CHEMISTRY (3:3:0)** The commercial preparation of important chemicals and derivatives with emphasis upon the chemistry involved and the flow of material. Prerequisite or concurrent: CHEM 013, 015.
831. **SELECTED TOPICS IN CHEMICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in chemical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## **CHEMISTRY (CHEM)**

011. **INTRODUCTORY CHEMISTRY (3:2:2)** Selected principles and applications of chemistry. Prior study of chemistry not assumed.
012. **CHEMICAL PRINCIPLES (3-4)** Basic concepts and quantitative relations. Prerequisite: Satisfactory performance on placement examination—students take CHEM 012 for 3 credits. Unsatisfactory performance on placement examination—students take CHEM 012 for 4 credits.
013. **CHEMICAL PRINCIPLES (3:3:0)** Continuation of CHEM 012, including introduction to the chemistry of the elements. Prerequisite: CHEM 012 or 017. Prerequisite or concurrent: CHEM 014.
014. **EXPERIMENTAL CHEMISTRY (1:0:3)** Introduction to quantitative experimentation in chemistry. Prerequisite or concurrent: CHEM 012.
015. **EXPERIMENTAL CHEMISTRY (1:0:3)** Continuation of CHEM 014, with emphasis on analytical procedures. Prerequisite: CHEM 014. Prerequisite or concurrent: CHEM 013.
017. **INTRODUCTORY AND GENERAL CHEMISTRY (5:5:2)** Introductory and general chemistry for students who are required to take additional chemistry, e.g., CHEM 013, but are unprepared

for CHEM 012. Students may not receive credit for both CHEM 017 and CHEM 011 or 012.

023. **INTRODUCTION TO MODERN ANALYTICAL CHEMISTRY (4:2:4)** Contemporary methods of chemical and instrumental analysis, including potentiometric titration, specific ion electrodes, spectrophotometry, and chromatography. Prerequisite: CHEM 015.

034. **ORGANIC CHEMISTRY (3:3:0)** Introduction to organic chemistry, with emphasis on the properties of organic compounds of biochemical importance. Not open to those who have previously scheduled CHEM 037. Prerequisite: CHEM 011 or 012 or 017.

035. **ORGANIC CHEMISTRY (3:2:4)** Introduction to organic chemistry, with emphasis on the identification of organic compounds by characteristic chemical reactions and by spectroscopy. Prerequisite: CHEM 034.

036. **LABORATORY IN ORGANIC CHEMISTRY (2:0:6)** Basic laboratory operations; applications of theories and principles. Prerequisite: CHEM 038. Prerequisite or concurrent: CHEM 039 or 040.

037. **ORGANIC CHEMISTRY (3:3:0)** Introduction to organic chemistry, with emphasis on topics of particular relevance to mineral science, materials science, and engineering. Not open to those who have previously scheduled CHEM 034. Prerequisite: CHEM 011 or 012.

038. **ORGANIC CHEMISTRY (4:4:0)** Principles and theories; nomenclature; chemistry of the functional groups; applications of spectroscopy. Students may not receive credit for both CHEM 038 and 034. Prerequisite: CHEM 013.

039. **ORGANIC CHEMISTRY (3:3:0)** Continuation of CHEM 038 to include especially polyfunctional organic molecules and the organic chemistry of biologically important molecules. Students may not receive credit for both CHEM 039 and 040. Prerequisite: CHEM 038.

040. **ORGANIC CHEMISTRY (2:2:0)** Continuation of CHEM 038 to include especially polyfunctional organic molecules. Students may not receive credit for both CHEM 039 and 040. Prerequisite: CHEM 038.

102. **ENVIRONMENTAL CHEMISTRY (3:3:0)** Applications of chemistry to environmental problems, including air, water, thermal pollution; pesticides; drugs and birth control agents; food additives; etc. For non-Chemistry majors; Chemistry majors will not receive credit.

389. **SPECIAL PROBLEMS AND RESEARCH (1-4)** Designed for freshman or sophomore students who are prepared to undertake special problems and research by arrangement with a faculty member.

395. **CHEMISTRY TEACHER ASSISTANT TRAINING (1-2)** Instruction and practice in the role of the teaching assistant in the undergraduate chemistry laboratory.

## CIVIL ENGINEERING TECHNOLOGY (CE T)

809. **TOPOGRAPHIC DRAWING (2:0:4)** Conventional mapping symbols; constructing topographic maps from stadia notes; estimating grading quantities from topographic maps. Prerequisite: E G 001 or 010. Prerequisite or concurrent: CE T 811 or WILD 802.

810. **STATISTICS AND LEAST SQUARES (3:3:0)** Frequency distribution; histograms; frequency polygons; measures of central tendency; dispersion; uses of normal curve; least squares applied to surveying problems. Prerequisite: MATH 808.

811. **PLANE SURVEYING (3:2:3)** Theory of plane surveying; use, care, and adjustments of surveying equipment; traversing, areas, leveling, stadia, and plane table mapping. Prerequisite: MATH 807.

812. **CURVES AND EARTHWORK (3:2:3)** Computation and laying out of horizontal and vertical curves; calculation of cut and fill; setting slope stakes for construction. Prerequisite or concurrent: CE T 811, MATH 807.

813. **PRACTICAL FIELD PROBLEMS (4:1:9)** Geodetics, topography, field astronomy; route location; hydrographic surveys; land subdivision; use of electronic measuring devices. Prerequisites: CE T 812, 818.

814. **PHOTOGRAMMETRY (3:1:4)** Interpretation and use of aerial photographs; mapping by photogrammetric methods; application of aerial and terrestrial photographic surveying to specific engineering problems. Prerequisite: CE T 818.

815. **GEODETIC SURVEYING (3:1:4)** Precision vertical and horizontal control surveys; level nets; reciprocal leveling; triangulation; state plane coordinates; astronomic observations for azimuth and latitude. Prerequisites: CE T 811, MATH 807.
816. **SPECIAL SURVEYS (3:1:4)** Applications of surveying in hydrography, mining, construction, and subdivision planning; surveying registration law and professional ethics. Prerequisites: CE T 812, 813.
817. **CARTOGRAPHIC TECHNIQUES (2:0:4)** Use of tools and equipment; projections used in art, advertising, navigation, government maps; relief methods; scribing techniques; map reproduction methods. Prerequisite: CE T 809.
818. **ROUTE SURVEYING (2:0:4)** Field and office operations connected with highway and railroad location; mass diagram as related to economical distribution of earthwork. Prerequisite: CE T 811. Concurrent: CE T 812.
821. **CONCRETE TECHNOLOGY (3:2:2)** Characteristics of portland cement concrete, physical properties of constituent materials, testing procedures, basics of reinforced concrete. Prerequisite or concurrent: E MCH 813.
822. **SOIL MECHANICS (3:2:2)** Identification, classification, sampling, testing, handling, and consolidation of soils for highway construction. Prerequisites: E MCH 811, PHYS 151.
823. **HIGHWAY ORGANIZATION AND OPERATIONS (3:2:2)** Fundamentals of technology; plans and specifications; drainage, cost, traffic studies, and highway safety. Prerequisite: second-year standing in Highway Engineering Technology.
824. **ASPHALT TECHNOLOGY (3:2:2)** The use and testing of asphaltic material as adapted to highways.
825. **CONSTRUCTION ESTIMATING (3:2:2)** Job organization, estimating, cost control, construction methods and equipment for highway construction projects.
830. **SELECTED TOPICS IN CIVIL ENGINEERING TECHNOLOGY (3)** Individual or group work in civil engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.
840. **HYDROLOGY AND DRAINAGE (3:2:2)** Introduction to railway hydrology and drainage, soil studies, erosion control, and hydraulic design of culverts. Prerequisites: CE T 809, 811.
841. **ECONOMIC RAILWAY LOCATION AND GEOMETRIC DESIGN (3:2:2)** Railway economics, history, design, and maintenance of vertical and horizontal curves; speed and superelevation. Prerequisites: CE T 812; CE T 816 or 818.
842. **RAILWAY TRACK MAINTENANCE AND OPERATION (3:2:2)** Specifications for safety standards for track, programming maintenance operations, track inspection. Prerequisite: CE T 841. Concurrent: CE T 843.
843. **RAILWAY TRACK STRUCTURE DESIGN AND CONSTRUCTION (3:2:2)** Design, layout, and construction of yards, turnouts, interlocking plants, and structures. Prerequisite or concurrent: E MCH 813. Concurrent: CE T 842.
861. **FLUID FLOW (3:3:0)** Elementary theory of fluid flow: hydrostatics; flow through orifices, Venturi meters, and pipes; flow in open channels; theory of the centrifugal pump. Prerequisites: E MCH 811, MATH 807.
890. **LEGAL ASPECTS OF SURVEYING (2:2:0)** Legal principles affecting the determination of property boundaries; responsibilities of surveyors, attorneys, title companies, and the court. Prerequisite: CE T 811.

## COMPUTER SCIENCE (CMPSC)

001. **BASIC COMPUTER PROGRAMMING (1:0:2)** Fundamental characteristics of digital computers; organization and coding of problems for solution on digital computer. Prerequisite: 2 entrance units in mathematics.
100. **COMPUTER FUNDAMENTALS AND APPLICATIONS (3:3:0)** Introduction to computer fundamentals and applications to data processing environments. Prerequisite: 2 entrance units in mathematics.
101. **INTRODUCTION TO ALGORITHMIC PROCESSES (3:3:0)** Properties of algorithms, lan-



guages, and notations for describing algorithms; applications of a procedure-oriented language to problem solving. Students who have passed CMPSC 201 or 203 may not schedule this course. Prerequisite: 2 entrance units in mathematics.

102. **COMPUTER ORGANIZATION AND PROGRAMMING (3:3:0)** Computer components and organization, representation of numbers and characters, instruction codes, machine language, programming, assembly systems, input-output, subroutines, and macros. Prerequisite: CMPSC 101.

120. **INTERMEDIATE PROGRAMMING (4:3:2)** Systematic programming: top-down program development, documentation, and testing. Verification of program correctness. Introduction to data structures, numerical methods. Prerequisites: CMPSC 101 or 201; MATH 140.

140. **INTRODUCTION TO DATA PROCESSING (3:3:0)** Applications of digital computers to problems in data processing with examples from accounting, record updating, inventory control, and report generation. Prerequisite: CMPSC 101.

142. **PROGRAMMING SYSTEMS FOR SMALL BUSINESS (3:3:0)** Business applications programming and systems design applicable to the small business environment. Prerequisite: CMPSC 140.

144. **DATA ORGANIZATION AND ACCESSING TECHNIQUES (4:3:2)** Design characteristics of external storage devices; record organizations; accessing considerations for sequential, direct, relative, and indexed files; internal data structures. Prerequisites: CMPSC 102, 140.

154. **ADVANCED ASSEMBLER, I/O TECHNIQUES, AND JOB CONTROL LANGUAGES (3:3:1)** Macro-expansion; assembler-level I/O control; COBOL-assembler linkage conventions; advanced debugging techniques; assembler design; op-system features and JCL techniques. Students may not take both CMPSC 154 and 442 for credit. Prerequisite: CMPSC 144.

164. **CONTEMPORARY TRENDS IN COMPUTER PROGRAMMING (3:3:0)** State of the technology in design, code, test, and documentation techniques for information processing systems and large EDP production programs. Students may not take both CMPSC 164 and 444 for credit. Prerequisite: CMPSC 154.

174. **ANALYSIS AND DESIGN OF INFORMATION SYSTEMS (2:1:2)** The organization, flow charting, programming, debugging, and documentation of a major applied problem in a field of computer application. Prerequisite: third-semester standing.

175. **IMPLEMENTATION OF INFORMATION SYSTEMS (1:0:2)** Implementation and evaluation of an information system as designed in CMPSC 174 with peer review of the design. Prerequisite: CMPSC 174.

201. **COMPUTER PROGRAMMING FOR ENGINEERS (3:3:0)** Development and implementation of algorithms in a procedure-oriented language, with emphasis on numerical methods for engineering problems. Students who have passed CMPSC 101 or 203 may not schedule this course. Prerequisite: MATH 141.

203. **PRINCIPLES OF PROGRAMMING WITH BUSINESS APPLICATIONS (3:2:2)** Computer program structures; data processing procedures; structure of data files; programming in a high-level language. Designed for business students. Students who have passed CMPSC 101 or 201 may not schedule this course. Prerequisites: ACCTG 101, Q B A 102; or ACCTG 101, Q B A 101, STAT 200.

211. **INTRODUCTION TO SYSTEMS PROGRAMMING (3:2:2)** Review of computer architecture concepts; assembly language programming, I/O routines, linkage and loading; microprocessor and large computer assembly languages. Prerequisite: CMPSC 120. Concurrent: E E 271.

803. **COMPUTER APPLICATIONS IN BUSINESS (3:3:0)** Characteristics of digital computers; the role of data processing in business; programming in a high-level language. Designed for two-year Business Administration students. Students who have passed CMPSC 101, 201, or 203 may not schedule this course.

804. **COMPUTER FUNDAMENTALS AND APPLICATIONS (2:2:0)** Types of computers and computer systems; storage and I/O devices; number systems and data representation; computer applications; typical EDP organization.

890. **SPECIAL TOPICS IN COMPUTER PROGRAMMING (1-3)** Application of any of several specific computer programming languages to problem solving. Prerequisite: CMPSC 101.



## **CURRICULUM AND INSTRUCTION (C I)**

295. **INTRODUCTORY FIELD EXPERIENCE FOR TEACHER PREPARATION** (2-3 per semester, maximum of 6) Selected observation of schooling situations with small group and tutorial participation. Prerequisite: second-semester standing. Concurrent: EDTHP 115 and/or EDPSY 014.

## **DIETETIC FOOD SYSTEMS MANAGEMENT (D S M)**

100. **THE PROFESSION OF DIETETICS** (1:1:0) Introduction to the profession and exploration of the roles and responsibilities of dietetic professionals.

103. **INTRODUCTION TO HEALTH FACILITIES FOOD SERVICE ADMINISTRATION** (3:3:0) Professional functions of the hospital food service system, relationships with the nutrition component of food service system, and organization served.

205. **HUMAN RELATIONS AND DIETETIC SUPERVISORY SKILLS** (3:3:0) Theories and principles of supervision and training of food service employees for overall operational effectiveness.

250. **QUANTITY FOOD PRODUCTION MANAGEMENT** (4:3:1) Systems approach to managing quantity food production functions in health care settings; included are quantity food production principles and standards.

260. **MANAGEMENT OF FOOD SERVICE OPERATING SYSTEMS** (4:3:1) Major principles related to managing the purchasing, food, and labor subsystems of a health care food service system. Prerequisite: D S M 250.

270. **QUALITY ASSURANCE FOR DIETETIC MANAGEMENT** (2:2:0) Theories, principles, and methods of managing quality dietetic services. Prerequisites: D S M 103, NUTR 252.

295. **PROFESSIONAL STAFF FIELD EXPERIENCE** (4:3:1) Methods of, and practice in, the client-oriented dietetic systems in health care facilities. Prerequisites: D S M 260, 304.

304. **MARKETING OF FOOD SERVICES IN HEALTH CARE FACILITIES** (3:3:0) Theories and applications of marketing principles to the design of consumer-oriented dietetic services.

## **EARTH SCIENCE (EARTH)**

001. **EARTH SCIENCE** (3:3:0) Integrated approach to fundamental problems in the earth sciences. Fields of study include geological sciences, physical geography, and meteorology. No credit will be given for this course if a student takes GEOSC 020, GEOG 019, or METEO 002.

## **ECONOMICS (ECON)**

002. **INTRODUCTORY MICROECONOMIC ANALYSIS AND POLICY** (3:3:0) Methods of economic analysis and their use; economic aggregates; price determination; theory of the firm; distribution.

004. **INTRODUCTORY MACROECONOMIC ANALYSIS AND POLICY** (3:3:0) National income measurement; aggregate economic models; money and income; policy problems.

014. **PRINCIPLES OF ECONOMICS** (3:3:0) Analysis of the American economy, emphasizing the nature and interrelationships of such groups as consumers, business, governments, labor, and financial institutions. Students who have passed ECON 002 or 004 or are registered in the College of Business Administration may not schedule this course.

302. **INTERMEDIATE MICROECONOMIC ANALYSIS** (3:3:0) Allocation of resources and distribution of income within various market structures, with emphasis on analytical tools. Prerequisite: ECON 002.

315. **LABOR ECONOMICS** (3:3:0) Economic analysis of employment, earnings, and the labor market; labor relations; related government policies. Prerequisite: ECON 002.

## EDUCATIONAL PSYCHOLOGY (EDPSY)

014. LEARNING AND INSTRUCTION (3:3:0) Psychology of human learning applied toward the achievement of educational goals; evaluation of learning outcomes.
297. SPECIAL TOPICS (1-9)

## EDUCATIONAL THEORY AND POLICY (EDTHP)

115. EDUCATION IN AMERICAN SOCIETY (3:3:0) Introduction to the development of educational institutions, with emphasis on historical, philosophical, and sociological forces.

## ELECTRICAL ENGINEERING TECHNOLOGY (EE T)

800. APPLIED ELECTRICITY (2:1:2) Fundamentals of electric circuits; basic principles of electrical machinery and devices; electrical-mechanical analogies; beginning electronics. Prerequisite: MATH 807.
801. FUNDAMENTALS OF ELECTRICAL CIRCUITS (4:4:0) Fundamental theory of resistance, current, voltage. Direct-current concepts from simplest series circuits through Thevenin's theorem; single-phase circuit fundamentals. Prerequisite or concurrent: MATH 807.
804. A.C. CIRCUITS (2:2:0) Application of network theorems, laws, and methods to alternating-current circuits; balanced and unbalanced polyphase systems. Prerequisite: EE T 814.
805. SEMICONDUCTOR LABORATORY (1:0:2) Laboratory study of semiconductors. Assembly and tracing of electronic circuits. Concurrent: EE T 810.
806. A.C. CIRCUITRY LABORATORY (1:0:2) Laboratory study of alternating-current circuits; assembly and tracing of electrical circuits. Concurrent: EE T 804.
809. ELECTRICAL CIRCUITS LABORATORY (1:0:2) Introduction to electrical apparatus, including instruments, their interconnection into basic circuits, observation of circuit behavior, and report writing. Concurrent: EE T 801.
810. FUNDAMENTALS OF SEMICONDUCTORS (3:3:0) Semiconductor physics and circuit theory including hybrid parameters; equivalent circuits; power amplifiers and frequency response of small signal amplifiers. Prerequisite or concurrent: EE T 814, MATH 808.
811. MICROPROCESSORS (3:2:2) Fundamentals of microprocessors, their application, and interfacing for data processing and control. Prerequisite: EE T 814.
813. FUNDAMENTALS OF ELECTRICAL MACHINES (3:2:2) Direct-current machinery principles and applications; introduction to machines and basic concepts of laboratory methods related to machinery studies. Prerequisites: EE T 814, 818.
814. ELECTRICAL CIRCUITS (3:3:0) Direct-current circuit analysis; introduction to basic magnetism and magnetic circuits; single-phase circuit fundamentals. Prerequisites: EE T 801, MATH 807.
815. A.C. MACHINERY AND CONTROL (3:3:0) Alternating-current machinery principles and applications; survey of alternating- and direct-current machinery control methods. Prerequisites: EE T 804, 813.
816. LINEAR ELECTRONIC CIRCUITS (3:3:0) Theoretical study of linear electronic devices and circuits, including field effect transistors, integrated circuits, and operational amplifiers. Prerequisite: EE T 810.
817. DIGITAL ELECTRONICS (4:4:0) Fundamentals of digital circuits, including logic circuits, boolean algebra, counters, A/D and D/A converters, and introduction to computer operation. Prerequisite: EE T 810.
818. ELECTRICAL CIRCUITS LABORATORY (2:0:4) Laboratory study of direct-current networks and alternating-current circuits. Prerequisite: EE T 809. Concurrent: EE T 814.
819. A.C. MACHINERY LABORATORY (1:0:2) Alternators, induction generators, single- and polyphase motors, synchro units, transformers, saturable reactors, and protective devices. Prerequisite: EE T 806. Concurrent: EE T 815.

## ENGINEERING

820. **DIGITAL ELECTRONICS LABORATORY (1:0:2)** Laboratory study of solid state pulse, digital, industrial, and motor control circuits. Prerequisite: EE T 805. Concurrent: EE T 817.

821. **LINEAR ELECTRONICS LABORATORY (1:0:2)** Laboratory study of transistors; study of differential and operational amplifiers. Emphasis is placed on circuit design. Prerequisite: EE T 805. Concurrent: EE T 816.

830. **SELECTED TOPICS IN ELECTRICAL ENGINEERING TECHNOLOGY (3)** Individual or group work in electrical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## ENGINEERING (ENGR)

002. **ENGINEERING ORIENTATION (1:0:2)** Introduction to efficient methods for analyzing and solving engineering problems.

005. **EXPERIMENTAL METHODS FOR ENGINEERS (1:0:2)** Introduction to experimental methods used in engineering. Applications of basic experimental and computational concepts through student involvement in laboratory experiments.

## ENGINEERING GRAPHICS (E G)

001. **ENGINEERING GRAPHICS (2:1:3)** Technical skills and drafting room practices; fundamentals of theoretical graphics; orthogonal, oblique, and perspective projections; working and schematic drawings.

003. **ARCHITECTURAL GRAPHICS (2:0:6)** Principles of architectural drawing; spatial relationships of points, lines, planes, and solids, with architectural applications; shadows, perspective.

010. **INTRODUCTORY ENGINEERING GRAPHICS (1:0:3)** Multiview projections, pictorial drawings, dimensioning, engineering standards, and working drawings.

011. **ENGINEERING DESIGN GRAPHICS (1:0:3)** Introduction to creative design, space analysis, graphs, graphical mathematics, vector analysis, and design implementation. Prerequisite: E G 010 or 021.

012. **SPATIAL ANALYSIS (2:1:3)** Spatial relations of points, lines, and solids, with engineering applications. Prerequisite: 1 credit of introductory graphics.

050. **ENGINEERING METHODS AND GRAPHICAL COMMUNICATION (3:1:5)** Introduction to engineering through graphics (multiviews, pictorials, dimensioning, space analysis); microcomputer literacy in BASIC, with computer graphics and instrumentation laboratory.

803. **ADVANCED ENGINEERING DRAWING (3:1:4)** Application of principles of engineering drawing, including auxiliary views in the layout of detail, assembly, and working drawings. Prerequisite: E G 001.

830. **SELECTED TOPICS IN ENGINEERING GRAPHICS (1-3)** Individual or group work in engineering graphics offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## ENGINEERING MECHANICS (E MCH)

810. **BASIC MECHANICS (2:2:0)** Forces; moments; resultants; equilibrium of force systems; introduction to dynamics. Prerequisite: MATH 807.

811. **ELEMENTARY MECHANICS (3:3:0)** Forces; moments; resultants; equilibrium of force systems; friction; centroids and moment of inertia of areas; dynamics of particles. Prerequisite: MATH 807.

812. **INTRODUCTION TO DYNAMICS (3:2:2)** Absolute and relative motion related to particles and simple linkages. Force-mass-acceleration, work-energy, and impulse-momentum solution techniques. Prerequisite: E MCH 811. Prerequisite or concurrent: MATH 808.

813. **STRENGTH AND PROPERTIES OF MATERIALS (3:3:0)** Axial stress and strain; shear; riveted



and welded connections; torsion; beam stresses and deflections; combined axial and bending stresses; columns, ductility, resilience, and toughness. Prerequisite: E MCH 811.

814. STRENGTH OF MATERIALS LABORATORY (1:0:2) Measurement of mechanical properties of materials; structural testing. Concurrent: E MCH 813.

## ENGLISH (ENGL)

004. BASIC WRITING SKILLS (3:3:0 per semester, maximum of 6) Intensive practice in writing sentences and paragraphs and instruction in grammar, usage, and punctuation. Designed for students with deficient preparation. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*

005. WRITING TUTORIAL (1:0:2) Tutorial instruction in composition and rhetoric for students currently enrolled in ENGL 004 or 015. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*

015. RHETORIC AND COMPOSITION (3:3:0) Instruction and practice in writing expository prose that shows sensitivity to audience and purpose. Prerequisite: ENGL 004 or satisfactory performance on the English proficiency examination.

030. HONORS FRESHMAN COMPOSITION (3:3:0) Writing practice for specially qualified and screened students. Students who have passed a special writing test will qualify for this course.

101. UNDERSTANDING LITERATURE (3:3:0) Introduction to the human and artistic values in selected short stories, novels, poems, and plays. Intended for nonmajors.

102. GREAT BOOKS OF BRITISH LITERATURE (3:3:0) Introduction to British literature through the reading and discussion of significant works. Intended for nonmajors.

103. GREAT BOOKS OF AMERICAN LITERATURE (3:3:0) Introduction to American literature through the reading and discussion of significant works. Intended for nonmajors.

104. THE BIBLE AS LITERATURE (3:3:0) Study of the English Bible as a literary and cultural document.

129. SHAKESPEARE (3:3:0) A selection of the major plays studied to determine the sources of their permanent appeal. Not recommended for English majors.

133. MODERN AMERICAN LITERATURE TO WORLD WAR II (3:3:0) Eliot, Frost, Faulkner, Fitzgerald, Hemingway, O'Neill, and other writers representative of the years between the world wars.

134. AMERICAN COMEDY (3:3:0) Studies in American comedy and satire, including such writers as Mark Twain, Faulkner, Vonnegut, and Heller.

139. BLACK AMERICAN LITERATURE (3:3:0) Fiction, poetry, and drama, including such writers as Baldwin, Douglass, Ellison, Morrison, and Wright.

140. CONTEMPORARY LITERATURE (3:3:0) Writers such as Barth, Beckett, Bellow, Ellison, Lowell, Mailer, Pinter, Plath, and Vonnegut.

165. GREAT ENGLISH NOVELS (3:3:0) Introduction to selected major novels by such writers as Defoe, Fielding, Austen, Bronte, Dickens, Hardy, Conrad, Joyce, Lawrence, and Woolf.

167. POETRY (3:3:0) Introduction to the appreciation and analysis of English and American poetry.

168. DRAMA (3:3:0) Introduction to the range of dramatic expression in selected plays, primarily English and American.

184. (C LIT 184) THE SHORT STORY (3:3:0) Lectures, discussions, readings in translation, with emphasis on major writers of the classical, medieval, Renaissance, and modern periods.

185. (C LIT 185) THE MODERN NOVEL IN WORLD LITERATURE (3:3:0) Development of the modern novel in the last century (outside the British Isles and the United States); lectures, discussions, readings in translation.

189. (C LIT 189) FOUNDATIONS OF MODERN DRAMA (3:3:0) Playwrights who set the world's stage for twentieth-century drama: Ibsen, Shaw, Chekhov, and Strindberg.

191. SCIENCE FICTION (3:3:0) Science fiction as the literature of technological innovation and social change—its development, themes, and problems.



## FILM

192. **THE LITERATURE OF FANTASY (3:3:0)** Major realms of fantasy in English and American literature: daydream and nightmare, the pastoral, dystopia, utopia, apocalypse, and the heroic.
194. **WOMEN WRITERS (3:3:0)** Short stories, novels, poetry, drama, and essays by major English and American women writers since 1870.
196. **(FOLK 196) ESSENTIALS OF ANGLO-AMERICAN FOLKLORE (3:3:0)** A basic introduction to verbal and nonverbal folklore, stressing the basic procedures of collection, classification, and analysis.
197. **AMERICAN FOLK SONG IN ENGLISH (3:3:0)** British songs in America; native repertoires, white and Negro; folk ballad; and musical development.
201. **WRITING IN THE SOCIAL SCIENCES (3:3:0)** Instruction in writing persuasive arguments about significant issues in the social sciences. Students may take only one course for credit from ENGL 201, 211, 218, and 219. Prerequisites: ENGL 015 or 030; fourth-semester standing.
211. **WRITING IN THE HUMANITIES (3:3:0)** Instruction in writing persuasive arguments about significant issues in the humanities. Students may take only one course for credit from ENGL 201, 211, 218, and 219. Prerequisites: ENGL 015 or 030; fourth-semester standing.
218. **TECHNICAL WRITING (3:3:0)** Writing for students in scientific and technical disciplines. Students may take only one course for credit from ENGL 201, 211, 218, and 219. Prerequisites: ENGL 015 or 030; fourth-semester standing.
219. **BUSINESS WRITING (3:3:0)** Writing reports and other common forms of business communication. Students may take only one course for credit from ENGL 201, 211, 218, and 219. Prerequisite: ENGL 015 or 030; fourth-semester standing.
297. **SPECIAL TOPICS (1-9)**
826. **REPORT WRITING (3:3:0)** Interpretation of statistical data and writing of technical reports. Prerequisite: ENGL 015.

## FILM (FILM)

180. **THE ART OF THE CINEMA (3:1:3)** The development of cinema to its present state; principles of evaluation and appreciation; examples from the past and present.

## FINANCE (FIN)

100. **INTRODUCTION TO FINANCE (3:3:0)** The nature, scope, and interdependence of the institutional and individual participants in the financial system. A student may not receive credit toward graduation for both FIN 100 and FIN 301. Prerequisite: third-semester standing.
108. **PERSONAL FINANCE (3:3:0)** Personal management of budgets, bank accounts, loans, credit buying, insurance, real estate, and security buying. May not be scheduled by College of Business Administration students. Prerequisite: third-semester standing.
297. **SPECIAL TOPICS (1-9)**
301. **CORPORATION FINANCE (3:3:0)** The acquisition and management of corporate capital; analysis of operations, forecasting capital requirements, raising capital, and planning profits. Prerequisites: ACCTG 101; ECON 002, 004; MATH 110; Q B A 101.
810. **COMMERCIAL BANK MANAGEMENT (3:3:0)** Managerial processes within the banking industry.

## FORESTRY (FOR)

105. **FOREST MENSURATION (3:2:2)** Measurement of forests and forest products.
106. **FOREST INVENTORIES (3:2:4)** Application of land surveying and sampling techniques, including statistical analysis, for the determination of timber volume and growth.
108. **FIELD STUDIES IN ECOLOGY (1)** Field studies in ecological problems, challenges, and impacts related to normal forest practices in general resource management. Prerequisite: FOR 826.

137. INTRODUCTION TO HARVESTING (1:0:4) Field application of harvesting techniques, including sale layout and operation of hand and power equipment.
138. INTERMEDIATE OPERATIONS (1:0:4) Field practicum in planting, pruning, and thinning of forest stands. Prerequisite: FOR 137.
140. LETTERING AND DRAFTING (2:0:4) Freehand, mechanical, transfer lettering skills and drafting room practices.
141. FOREST SURVEYING (4:2:8) Plane surveying and mapping techniques as applied to forestry practices. Prerequisite or concurrent: FOR 140, MATH 807.
202. (F P 202) FOREST RESOURCES FIELD ORIENTATION (1:0:3) Field orientation to the interdisciplinary aspects of forest resources management and forest products utilization. Concurrent: FOR 200, 203, F P 201.
203. FIELD DENDROLOGY (2:0:6) Identification of trees and shrubs by leaf, fruit, bud, twig, and bark.
220. FOREST ECOSYSTEM PROTECTION (3:3:0) Principles and concepts involved in managing the forest ecosystem in regard to fires, insects, and diseases.
221. FOREST FIRE TECHNOLOGY (1:0:3) Technological aspects of controlling and using fire in the forest environment. Prerequisite: FOR 220.
234. RECLAMATION MANAGEMENT (3:2:3) Consideration of various factors of soils, hydrology, and reclamation in the reclaiming and revegetation of disturbed sites. Prerequisite: FOR 841 or 366 or C E 114 or 210.
240. SILVICULTURAL PRACTICES (3:2:3) Principles and techniques of forest establishment, culture, regeneration, and harvesting. Prerequisite: FOR 203 or 250.
241. AERIAL PHOTO INTERPRETATION (4:2:6) Aerial photo interpretation techniques applied to land management inventories, mapping, road location, and procurement. Prerequisites: FOR 203; 804 and 806, or 366.
242. ELEMENTS OF PROJECT SUPERVISION IN FORESTRY (3:3:0) Supervisory techniques developed through an understanding of the behavioral sciences applied to field forestry personnel management.
245. MICROCOMPUTERS IN FORESTRY (2:1:2) Computer literacy; elementary programming in basic and software applications in forestry. Prerequisite: FOR 850 or 3 credits in mathematics.
250. DENDROLOGY (3:0:6) Taxonomy, identification, ranges, and uses of important U.S. timber species and lesser vegetation of a regional nature.
807. FOREST RECREATION (3:2:3) Development, construction, and management of forest recreation areas and facilities. Prerequisite: FOR 841.
808. FOREST PROTECTION (3:2:3) Forest fire prevention, detection, behavior, and suppression; fire plans and statistics; insect and disease control.
814. FORESTRY LEADERSHIP PRACTICUM (1:0:3) Leadership techniques applied to standard forestry field operations. Prerequisite: FOR 242.
817. URBAN FORESTRY (3:2:3) The application of land treatment techniques and forestry practices to urban environments. Prerequisites: FOR 807.
818. INDIVIDUAL STUDIES (1-3 per semester) Individual study of forest technology.
820. ADVANCED FOREST MEASUREMENTS (1) Application of point and 3P sampling methods as a means of developing the data base for integrated forest management planning. Prerequisites: FOR 809, 826.
822. FOREST MANAGEMENT SYSTEMS (2) Field projects and an extended field tour dealing with silvicultural, mensurational, and regulation techniques of forest management. Prerequisite: FOR 240.
825. HARVESTING TECHNIQUES (1:0:3) Practical instruction in the operation of heavy equipment used in timber harvesting. Prerequisite: FOR 824.
826. REFORESTATION AND INTERMEDIATE OPERATIONS (1:0:3) Field practicum in planting, pruning, thinning forest stands. Prerequisite: FOR 825.
827. FIELD STUDY PREPARATION (1) Developing practices, procedures, and materials for conducting integrative field studies. Prerequisites: FOR 241, 809.

## FRENCH

828. SAWMILL ORIENTATION (1:1:0) An overview of sawmill industry equipment, processes, and products.
829. SAWMILL BUSINESS MANAGEMENT (3:2:3) Fundamental business practices applied to a small sawmill business enterprise. Prerequisite: FOR 828.
830. SAWMILL OPERATION (3:2:3) Technical and applied aspects of sawmilling. Prerequisite: FOR 828.
831. SAWMILL OPERATION PRACTICUM (4) Extended hands-on experience to develop operational competencies in running a small sawmill. Prerequisite: FOR 830.
850. FORESTRY QUANTIFICATION (4:4:0) Principles of quantification applied to natural resources management and surveying.
860. FOREST VALUATION (1) Gathering and analyzing cost and production data related to stumpage valuation and equipment management. Prerequisite: FOR 106.

## FRENCH (FR)

001. ELEMENTARY FRENCH I (4:4:0) Grammar, with reading and writing of simple French; oral and aural work stressed. Students who have received high school credit for two or more years of French may not schedule this course for credit without permission of the department.
002. ELEMENTARY FRENCH II (4:4:0) Grammar and reading continued; oral and aural phases progressively increased. Students who have received high school credit for four years of French may not schedule this course for credit without permission of the department. Prerequisite: FR 001.
003. INTERMEDIATE FRENCH (4:4:0) Grammar, reading, composition, oral and aural exercises. Prerequisite: FR 002.
140. FRENCH NOVEL IN ENGLISH TRANSLATION (1-6) Readings of selected French masterpieces in translation; discussion of recurring themes in several literary periods.

## GEOGRAPHY (GEOG)

019. GEOGRAPHY OF MAN'S ENVIRONMENT (3:2:2) Survey and synthesis of processes creating geographical patterns of natural resources, with application of basic environmental processes in resource management.
020. MAN'S WORLD: AN INTRODUCTION TO MODERN HUMAN GEOGRAPHY (3:3:0) Spatial perspective on human societies in a modernizing world; regional examples; use of space and environmental resources; elements of geographic planning.
024. ELEMENTS OF CULTURAL GEOGRAPHY (3:3:0) Locational analysis of changes in non-Western cultures. Problems of plural societies, economic development, population growth, and settlement.
026. HUMAN GEOGRAPHY (3:3:0) Introduction to concepts, principles, and theories of spatial organization.

## GEOSCIENCES (GEOSC)

- \*001. PHYSICAL GEOLOGY (3:2:3) Earth processes and their effects on the materials, structure, and morphology of the earth's crust. Practicum includes field work, study of rocks, minerals, dynamic models, and topographic maps.
- \*020. OUR EARTH (3:2:2) Nontechnical presentation of earth processes, materials, and landscape. Practicum includes field trips, study of maps, rocks, and dynamic models, introduction to geologic experimentation.
- \*021. EARTH HISTORY (3:2:2) Evolution of the earth; changing patterns of mountains, lowlands, and seas; development of living organisms. Practicum includes field trips, studies of geologic maps, geologic problems, fossils.

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\*This course includes from one to several field trips for which an additional charge will be made to cover transportation.



## GERMAN (GER)

001. **ELEMENTARY GERMAN I (4:3:2)** Listening, speaking, reading, writing; introduction to basic structures and vocabulary through dialogs and literary and cultural readings. Students may receive credit for only one of the following: GER 001, 011, or 015. Students who have received high school credits for two or more years of German may not schedule this course for credit without permission of the department.

002. **ELEMENTARY GERMAN II (4:3:2)** Listening, speaking, reading, writing; introduction to basic structures and vocabulary through dialogs and literary and cultural readings. Students may receive credit for only one of the following: GER 002, 012, or 016. Students who have received high school credit for four years of German may not schedule this course for credit without permission of the department. Prerequisite: GER 001.

003. **INTERMEDIATE GERMAN (4:3:2)** Continued skill development; readings consisting of short literary and journalistic writings; increased attention to German cultural context. Students may receive credit for only one of the following: GER 003, 012, or 016. Prerequisite: GER 002.

011. **INTENSIVE BASIC GERMAN (6:5:2)** Listening, speaking, reading, writing basic structures and vocabulary through dialogs and literary and cultural readings. Students may receive credit for only one of the following: GER 001, 011, or 015. Prerequisite: GER 002.

012. **INTENSIVE INTERMEDIATE GERMAN (6:5:2)** Continued skill development of structures and vocabulary; listening, speaking, reading, writing. Taught on an accelerated basis. Students may receive credit for only one of the following: GER 002, 003, 012, or 016. Prerequisite: GER 011.

015. **READING GERMAN I (3:3:0)** Survey of German grammar, with readings in technical prose, for students whose programs permit only two semesters of foreign language. Students may receive credit for only one of the following: GER 001, 011, or 015.

016. **READING GERMAN II (3:3:0)** Continuation of GER 015, with readings in the student's own field. Students may receive credit for only one of the following: GER 002, 012, or 016. Prerequisite: GER 015.

100. **GERMAN CULTURE AND CIVILIZATION (3:3:0)** Life of the German people from the early Middle Ages to modern times; their literature and arts, music, science, and philosophy. Conducted in English.

## HEALTH EDUCATION (HL ED)

013. **STANDARD FIRST AID, PERSONAL SAFETY, AND CPR (1:1:1)** Theoretical and technical aspects of standard first aid, personal safety, and cardiopulmonary resuscitation (CPR).

019. **MAN AND DISEASE (1:1:0)** Essentials of communicable and chronic disease control.

045. **ALCOHOL AWARENESS EDUCATION (1:1:0)** A course designed to raise awareness relative to the use and abuse of beverage alcohol.

046. **INTRODUCTION TO HEALTH ASPECTS OF HUMAN SEXUALITY (1:1:0)** An examination of health concerns related to sexuality and sexual behavior.

048. **VALUES AND HEALTH BEHAVIOR (1:1:0)** An exploration of opinions, beliefs, attitudes, and personal values as they relate to decision making and health behavior.

057. **CONSUMER HEALTH (1:1:0)** Essentials for determining credibility of claims for particular health services and products from a consumer's perspective.

303. **EMERGENCY CARE (2:1:2)** Competencies leading to American Red Cross Advanced First Aid and Emergency Care and American Heart Association Cardiopulmonary Resuscitation certification.

384. **APPLIED KINESIOLOGY (3:2:2)** Study of anatomical structure, body movement. Characteristic muscle action and motion will be analyzed in relation to physical therapy context. Prerequisite: BIOL 029.

800. **PHYSICAL THERAPIST ASSISTANT – INTRODUCTION (3:2:2)** Orientation to the field of physical therapy, historical background of the profession, professional ethics, medical terminology, and patient transportation techniques.



## HEALTH PLANNING AND ADMINISTRATION

801. **PHYSICAL THERAPIST ASSISTANT — PROCEDURES (4:2:4)** General considerations for physical therapy modalities; development of skills and their application; diagnostic testing. Prerequisite: HL ED 800.

802. **CLINICAL NEUROSCIENCE (1:1:0)** Anatomical and pathological basis of common conditions involving the nervous system, with emphasis on treatment and management techniques. Prerequisites: BIOL 029, HL ED 803.

803. **MEDICAL SURGICAL ORIENTATION TO THERAPY (3:3:0)** Introduction to medical and post-operative conditions and/or disease states most frequently treated by physical therapy modalities. Prerequisites: BIOL 029, 041, 042.

804. **THERAPEUTIC EXERCISE (3:2:4)** Introduction to the principles of exercise in the treatment of disease and injury.

805. **REHABILITATION (2:1:3)** Examination of techniques and practical experience with appliances used in the rehabilitation of the physically disabled.

806. **PHYSICAL THERAPIST ASSISTANT — PRACTICUM (10)** The practice of physical therapist assistant skills in a clinical setting under the direct supervision of a registered physical therapist. Prerequisites: HL ED 804, 805.

807. **TECHNIQUES FOR EFFECTIVE PATIENT INTERACTION (1:1:1)** Techniques of interacting with the sick or disabled patient; emphasis will be on enhancing interaction skills. Prerequisite: PSY 002.

808. **CLINICAL ORTHOPEDICS (1:1:0)** Anatomical and pathological basis of common musculoskeletal conditions, with emphasis on current treatment techniques. Prerequisites: BIOL 029, HL ED 803.

## HEALTH PLANNING AND ADMINISTRATION (H P A)

101. **INTRODUCTION TO HEALTH SERVICES ORGANIZATION (3:3:0)** Examination of social, political, economic, historic, and scientific factors in the development and organization of the medical care health services.

## HISTORY (HIST)

001. **THE WESTERN HERITAGE I (3:3:0)** A survey of the Western heritage from the ancient Mediterranean world to the dawn of modern Europe.

002. **THE WESTERN HERITAGE II (3:3:0)** A survey of the Western heritage from the dawn of modern Europe in the seventeenth century to the present.

010. **NON-WESTERN CIVILIZATIONS (3:3:0)** Introduction to social, economic, and political evolution of non-Western cultures; responses to the West; modernization and development.

012. **HISTORY OF PENNSYLVANIA (3:3:0)** Chronological and topical survey, emphasizing immigration of diverse ethnic groups and religious, political, economic, and social developments, including industrialization and urbanization.

020. **AMERICAN CIVILIZATION TO 1877 (3:3:0)** An historical survey of the American experience from its colonial beginnings through the Civil War and Reconstruction.

021. **AMERICAN CIVILIZATION SINCE 1877 (3:3:0)** An historical survey of the American experience from the emergence of urban-industrial society in the late nineteenth century to the present.

100. **ANCIENT GREECE (3:3:0)** Greek world from the earliest Aegean cultures to the death of Alexander the Great and the beginnings of Hellenistic civilization.

101. **THE ROMAN REPUBLIC AND EMPIRE (3:3:0)** History of the Roman Republic and Empire from the origins of Rome to the disintegration of the Empire.

107. **(MEDVL 107) MEDIEVAL EUROPE (3:3:0)** Rise and development of the civilization of medieval Europe from the decline of Rome to 1500.

120. **EUROPE SINCE 1848 (3:3:0)** Political, social, and ideological developments; origin and impact of two World Wars; totalitarianism and democracy; changing role in the world.

141. **MEDIEVAL AND MODERN RUSSIA (3:3:0)** Introductory survey, including political, social, economic, and cultural development of Kievan, Muscovite, and Imperial Russia.
142. **HISTORY OF COMMUNISM (3:3:0)** Marxism; Leninism and evolution of the Soviet Union; formation and development of the Communist bloc; impact of Chinese Communism.
143. **HISTORY OF FASCISM AND NAZISM (3:3:0)** The study of right-wing totalitarianism in the twentieth century, with special emphasis on Fascist Italy and Nazi Germany.
144. **THE WORLD AT WAR: 1939-1945 (3:3:0)** In-depth study of the origins and conduct of World War II. Political and economic aspects as well as military.
150. **COLONIAL PENNSYLVANIA (3:3:0)** Development of the colony of Pennsylvania through the war for American independence, covering immigration, economics, politics, religion, and society.
151. **TECHNOLOGY AND SOCIETY IN AMERICAN HISTORY (3:3:0)** Development of technology in America from colonial times; its reception and its influence on social, economic, and political life.
152. **THE AFRO-AMERICAN EXPERIENCE (3:3:0)** African roots; colonial and revolutionary experiences; slavery and abolitionism; civil war and reconstruction; accommodation and protest; the new militancy.
154. **HISTORY OF WELFARE IN AMERICA (3:3:0)** History of the care of dependent people (including children, the aged, mentally ill, unemployed) from colonial times to the present.
155. **AMERICAN BUSINESS HISTORY (3:3:0)** The development of business from the planting of the colonies, through the stages of industrialization, to the present.
156. **(L S 156) HISTORY OF THE AMERICAN WORKER (3:3:0)** A study of the American worker from the preindustrial era to the present.
158. **HISTORY OF AMERICAN IMMIGRATION (3:3:0)** The waves of migration to America and an analysis of the resulting minority groups, their reception, assimilation, and persisting identity.
171. **HISTORY OF MODERN SOUTHEAST ASIA (3:3:0)** Sociopolitical survey of Southeast Asian history emphasizing the modern period. Origins of traditional civilization, colonialism and nationalism, problems of independence.
174. **THE HISTORY OF TRADITIONAL EAST ASIA (3:3:0)** Comparative cultural, institutional, and social history of traditional China and Japan to their contact with the industrialized West.
175. **THE HISTORY OF MODERN EAST ASIA (3:3:0)** Comparative survey of the internal developments and external relations of China and Japan since their contact with the industrialized West.
178. **LATIN-AMERICAN HISTORY TO 1820 (3:3:0)** Conquest of the New World, development of colonial institutions, impact on native cultures, and origins of independence movements.
179. **LATIN-AMERICAN HISTORY SINCE 1820 (3:3:0)** Origin, political growth, international relations, and economic status of the Latin-American republics, with emphasis upon present-day conditions.
181. **INTRODUCTION TO THE MIDDLE EAST (3:2:2)** Origins of Islamic civilization; expansion of Islam; the Ottoman Empire; the Middle East since 1918.
191. **EMERGING AFRICA (3:3:0)** Indigenous African societies; impact of Rome, Islam, and Europe; slave trade; colonialism; nationalism; problems since independence.
195. **HISTORY OF CANADA (3:3:0)** An integrated survey from French colonial beginnings to modern Dominion status, with special emphasis on relations with the United States.

## **HOTEL AND FOOD SERVICE (H F S)**

802. **SANITATION PRACTICES IN FOOD SERVICE OPERATIONS (3:3:0)** Practical applications related to the management of the sanitation subsystem within a food service operation.
804. **HOTEL AND FOOD SERVICE MERCHANDISING (3:3:0)** Merchandising as a system distributing benefits, collecting costs, concerned with motivating consumers. Topics include promotion, menu planning, and research methods.

## **HOTEL, RESTAURANT, AND INSTITUTIONAL MANAGEMENT (HR&IM)**

102. INTRODUCTION TO CAREERS IN THE HOSPITALITY INDUSTRY (2:2:0) Exploration and analysis of management opportunities in various segments of the hospitality industry.
290. ROOMS MANAGEMENT IN THE LODGING INDUSTRY (3:3:0) Introduction to the rooms management function, focusing on pricing forecasting and interactions with other departments of the property. Prerequisites: HR&IM 102; 3 credits in computer science.
301. INTRODUCTION TO THE MANAGEMENT OF SERVICE OPERATIONS (3:3:0) A rigorous introduction to management principles and concepts used in service operations.
310. FOOD AND BEVERAGE PURCHASING AND SANITATION (3:3:0) Food and beverage purchasing and sanitation principles for hospitality operations.
295. ANALYSIS OF FIELD EXPERIENCE I (2:2:0) Directed written and oral analysis of the 500-hour hospitality working experience focusing on the physical and social environment.
320. PHYSICAL SYSTEMS IN THE HOSPITALITY INDUSTRY (3:3:0) Principles governing costs, energy management, and operations in heating, plumbing, refrigeration, air conditioning, and other equipment.
337. FOOD, BEVERAGE, AND LABOR COST CONTROL (3:3:0) Techniques for analyzing and controlling food, beverage, and labor costs in hospitality organizations. Prerequisite: 3 credits in accounting.
850. QUANTITY FOOD PRODUCTION ANALYSIS (4) Physical characteristics of principal food product groups considered. Topics include purchasing problems, preparation techniques, quality and cost control.
860. HOSPITALITY SUPERVISION SEMINAR (4) Hospitality management topics are discussed with a major emphasis on operations management. Prerequisites: H F S 804, HR&IM 290, 301, 310.
870. HOSPITALITY ADMINISTRATION SEMINAR (4) Components of food service systems are identified and studied as separate problems and as a total system. Prerequisite: HR&IM 860.

## **HUMAN DEVELOPMENT (H DEV)**

100. INTRODUCTION TO HUMAN DEVELOPMENT (1:1:0) Human development as a process of man-environment transactions, and the relationships of various fields to the study of that process.
101. HUMAN GROWTH AND DEVELOPMENT (3:3:0) Factors affecting human development, health, and behavior over the life span: biological, environmental, psychosocial, community, and historical.
102. POLICY AND PLANNING FOR HUMAN DEVELOPMENT (3:3:0) Multidisciplinary analysis of concepts and practice in the creation and administration of social interventions for human development.
200. EMPIRICAL INQUIRY IN HUMAN DEVELOPMENT (3:2:2) Introduction to methods and philosophy of empirical inquiry applied to problems of human development.
395. FIELD PROJECTS (1-12) Independent study and research in a human service program; written and oral summary of rationale, procedures, findings.

## **HUMANITIES (HUMAN)**

001. VALUES OF THE WESTERN CULTURAL HERITAGE (3:3:0) Fundamental values of human experience as expressed in outstanding philosophical and literary works.
002. SHAPING OF THE MODERN MIND (3:3:0) Relevance to the present age of influential literary and philosophical texts illustrative of the principal epochs of Western civilization.
021. IDEAS AND ARTS (3:3:0) Interaction of intellectual and aesthetic values from the Renaissance to the present.



050. THE LITERATURE AND LORE OF MINING (3:3:0) Experience and values of mining tradition: survey of the literature and lore, including field experience.
101. MODERN SCIENCE AND HUMAN VALUES (3:3:0) Relationships of science to the aspirations, values, and arts of man.
102. THE GRAND TOUR: A VISUAL SURVEY OF EUROPEAN HISTORY (3:3:0) An historical interdisciplinary examination of the visual heritage of Italy, France, Germany, Spain, and the British Isles.

## INDIVIDUAL AND FAMILY STUDIES (I F S)

129. INTRODUCTION TO INDIVIDUAL AND FAMILY DEVELOPMENT (3:3:0) Introduction to psychosocial and family development at all stages of the individual and family life cycle.
216. PERSONAL AND INTERPERSONAL SKILLS (3:3:0) Conceptions of life-span personal and interpersonal skill enhancement.
218. FOUNDATIONS OF MARRIAGE (3:3:0) Factors influencing the husband/wife relationship across the life course.
219. FAMILY FINANCIAL MANAGEMENT (3:3:0) How families plan their finances and factors that determine their decisions.
229. INFANT AND CHILD DEVELOPMENT (3:3:0) Social, behavioral, and biological development and intervention during infancy and childhood.
239. ADOLESCENT DEVELOPMENT (3:3:0) Social, behavioral, and biological development and intervention throughout adolescence.
249. ADULT DEVELOPMENT AND AGING (3:3:0) Physiological, psychological, and social development and intervention from young adulthood through old age.
297. SPECIAL TOPICS (1-9)
311. INDIVIDUAL AND FAMILY INTERVENTIONS (3:3:0) Survey of individual and family formal and informal intervention efforts; historical and current perspectives and approaches. Prerequisites: I F S 129; 3 credits in social, behavioral, or biological sciences.
315. FAMILY DEVELOPMENT (3:3:0) Family functions over the life course: family from a multidisciplinary perspective, emphasizing adaptation and change. Prerequisites: I F S 129; 3 credits in social, behavioral, or human biological sciences.
327. HUMAN DEVELOPMENT ACROSS THE LIFE SPAN (3:3:0) A review of research and theory on human development across the life span from a multidisciplinary perspective. Prerequisites: I F S 129; 3 credits in social, behavioral, or human biological sciences.
330. OBSERVATION OR EXPERIENCE WITH PRESCHOOL CHILDREN (1-4) Directed observations of, or supervised experience with, preschool children in group or home settings. Prerequisite: I F S 327 or PSY 213.

## INDUSTRIAL ENGINEERING (I E)

315. INDUSTRIAL ORGANIZATION AND ADMINISTRATION (3:3:0) Fundamental principles of organization leading to intelligent appreciation of the simpler problems of factory organization and operation. Students registered in Industrial Engineering may not schedule this course.

## INDUSTRIAL ENGINEERING TECHNOLOGY (IE T)

805. ECONOMICS OF INDUSTRY (2:2:0) Internal economics of industrial enterprise, cost factors, and methods of comparing alternate proposals.
809. INSPECTION AND QUALITY CONTROL (3:2:2) Inspection methods and procedures and their applications to control and acceptance sampling based on statistical methods. Prerequisite: MATH 807.



## **INSURANCE**

811. **MANUFACTURING MATERIALS AND PROCESSES (3:2:3)** Mechanical properties of materials; primary processing methods used in manufacturing, emphasizing ferrous metals, their relationship to other metals and nonmetals.
812. **MANUFACTURING PROCESSES (3:1:6)** Technology related to metal removal, dimensional inspection, metal joining, hot and cold forming heat treating, metal casting, properties of materials. Prerequisite: IE T 811.
815. **PRODUCTION DESIGN (3:1:4)** The planning, designing, and specifying of both standard and special tools required for the production of manufactured goods. Prerequisites: E G 803, IE T 812.
830. **SELECTED TOPICS IN INDUSTRIAL ENGINEERING TECHNOLOGY (3)** Individual or group work in industrial engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## **INSURANCE (INS)**

102. **PERSONAL INSURANCE PLANNING (3:3:0)** Introduction to the principles and practices of personal insurance planning. May not be scheduled by College of Business Administration students. Prerequisite: third-semester standing.
301. **RISK AND INSURANCE (3:3:0)** Introduction to the principles and methods of handling business and personal risks; emphasis on insurance techniques. Prerequisite: fourth-semester standing.
800. **INSURANCE PRINCIPLES (3:3:0)** Introductory survey of all lines of insurance for handling business and personal risks.
810. **LIFE INSURANCE (3:3:0)** The life insurance contracts as methods of treating the problems of premature death and superannuation. Prerequisite: INS 800.
820. **PROPERTY AND CASUALTY INSURANCE (3:3:0)** Fundamental principles of property and casualty insurance. Prerequisite: INS 800.
830. **INSURANCE PRACTICUM (3:3:0)** Practical introduction to insurer operations in company and agency offices. Prerequisite: INS 820.

## **INTERNATIONAL BUSINESS (I B)**

862. **INTERNATIONAL BUSINESS (3:3:0)**

## **INTERNATIONAL UNDERSTANDING (INT U)**

200. **INTERNATIONAL UNDERSTANDING AND WORLD AFFAIRS (3:3:0)** Interdisciplinary consideration of international problems, conflict and accommodation; impact of various cultures and ideologies on world affairs and foreign policy. Credit will not be given for both this course and PL SC 014. Prerequisite: third-semester standing.

## **JOURNALISM (JOURN)**

200. **THE MASS MEDIA AND SOCIETY (3:3:0)** Mass communications in the United States; organization, role, content, and effects of newspapers, magazines, television, radio, books, and films. Not intended for students in the School of Journalism.
213. **NEWS WRITING AND REPORTING (4:2:4)** News and news values; legal and ethical problems of reporting; writing and reporting news for the mass media. Prerequisites: typing proficiency; and ENGL 030, fourth-semester standing; or ENGL 201 or 211.
250. **WOMEN, MINORITIES, AND THE MEDIA (3:3:0)** Analysis of historical, economic, legal, political, and social implications of the relationship between women, minorities, and the mass media.

## LABOR STUDIES (L S)

- 100. INDUSTRIAL RELATIONS (3:3:0) Introductory analysis of the employment relationship and of the interrelated interests of managements, workers, unions, and the public.
- 102. THEORIES AND FUNCTIONS OF LABOR ORGANIZATIONS (3:3:0) Study of the theory and practice of labor organizations: goals, internal structure and operations, and impact on society.
- 103. LABOR LAW (3:3:0) A study of legislation affecting labor organizations and their members.
- 104. THE PRACTICE OF COLLECTIVE BARGAINING (3:3:0) Study of the factors involved in negotiating labor contracts, the issues, processes, bargaining relationships, and public responsibilities facing the parties.
- 156. (HIST 156) HISTORY OF THE AMERICAN WORKER (3:3:0) A study of the American worker from the preindustrial era to the present.
- 296. INDEPENDENT STUDIES (1-18)

## LIBRARY STUDIES (L ST)

- 110. INFORMATION ORGANIZATION AND RETRIEVAL (3:2:2) Information structure and resources related to search and problem-solving procedures to identify, organize, and locate print and nonprint materials. Prerequisite: ENGL 015 or 030.

## MANAGEMENT (MGMT)

- 100. SURVEY OF MANAGEMENT (3:3:0) Introduction to organizational factors relevant to management processes, including leadership, motivation, job design, technology, organizational design and environments, systems, change. For non-Business students only.
- 802. SUPERVISORY MANAGEMENT (3:3:0) Preparation for supervisory positions in formal organizations. Emphasis placed on the motivational aspects of the supervisor's job. Prerequisite: MGMT 100.

## MANAGEMENT INFORMATION SYSTEMS (M I S)

- 100. INTRODUCTION TO MANAGEMENT INFORMATION SYSTEMS (3:3:0) Business computer systems and their impact on management decision making. A student cannot receive credit toward graduation for both M I S 100 and M I S 431.
- 103. MICROCOMPUTER APPLICATIONS IN BUSINESS (3:3:0) Introduction to current business uses of the microcomputer, including spreadsheets, database management, word processing, and decision-making models.
- 106. SPECIALIZED MICROCOMPUTER APPLICATIONS IN BUSINESS (1-6) Use of the microcomputer in the functional areas of business (e.g., accounting, management, marketing, finance, etc.). Prerequisites: 3 credits in a business administration appropriate functional area; prior written approval of department.
- 110. INTRODUCTION TO COBOL (3:3:0) Fundamentals of structured COBOL programming. Prerequisite: M I S 100.
- 111. ADVANCED COBOL (3:3:0) Advanced structured COBOL programming. Prerequisite: M I S 110.

## MARKETING (MKTG)

- 220. PERSONAL SELLING (3:3:0) Principles underlying the sales process and practical application of these principles to selling situations. Studies role of selling in total marketing process. Prerequisite: third-semester standing.
- 221. CONTEMPORARY AMERICAN MARKETING (3:3:0) Social and economic aspects; movement of goods and services from producers to consumers; analysis of marketing functions, sys-

## MATHEMATICS

tems, and institutions. A student may not receive credit toward graduation for both MKTG 221 and 301. Prerequisite: 3 credits in economics.

801. PRINCIPLES OF MARKETING (3:3:0) Prerequisite: MKTG 221.

802. PROMOTION MANAGEMENT (3:3:0) The application and management of various forms of persuasive communication with potential customers: personal selling, sales management, advertising, sales promotion. Prerequisite: MKTG 801.

803. PRINCIPLES OF RETAILING (3:3:0) Introduction to the management of retailing organizations, with emphasis on decision making. Not open to retailing majors.

804. PRINCIPLES OF RETAILING SALESMANSHIP (3:3:0) Principles of selling applied to the retail level of trade; practical application of these principles in various sales situations.

805. RETAILING I (3:3:0) An analysis of the management and merchandising policies of various types of retailing institutions.

806. RETAILING II (3:3:0) Merchandising, promotion, and control policies of retail store management. Prerequisite: MKTG 805.

807. INTRODUCTION TO MARKETING RESEARCH (3:3:0) Managerial aspects of marketing research, with emphasis on practical details of operating a small-scale project. Prerequisites: MKTG 221, Q B A 801.

808. PRINCIPLES OF EFFECTIVE PURCHASING (3:3:0) Introduction to the purchasing function in organizations, with emphasis on integration of purchasing activity with other aspects of marketing management. Prerequisite: MKTG 221.

809. PRODUCT PLANNING AND DEVELOPMENT (3:3:0) Problems faced by the product or branch manager including those of planning, research, and consumer satisfaction. Prerequisite: MKTG 221.

810. PRINCIPLES OF INDUSTRIAL MARKETING (3:3:0) Introduction to the management of industrial marketing strategy. Emphasizes strategic response to industrial marketing opportunities and response to competition. Prerequisite: MKTG 221.

## MATHEMATICS (MATH)

004. INTERMEDIATE ALGEBRA (3:3:0) Polynomials, fractions, exponents, radicals, first- and second-degree equations and inequalities, sequences, systems of equations. Limited to students indicating deficiencies on the mathematics (algebra) proficiency examination. *This course may not be used to satisfy the basic minimum requirements for graduation in any baccalaureate degree program.*

005. COLLEGE ALGEBRA I (3:3:0) Polynomial and rational expressions; exponents and radicals; equations and inequalities; functions, relations, and their graphs; exponential and logarithmic functions. Prerequisite: MATH 004 or satisfactory performance on the mathematics (algebra) proficiency examination.

006. PLANE TRIGONOMETRY (3:3:0) Trigonometric functions; solutions of triangles; trigonometric equations; identities. Prerequisites: MATH 005 or satisfactory performance on the mathematics (algebra) proficiency examination; 1 unit of geometry.

017. FINITE MATHEMATICS (3:3:0) Introduction to logic, sets, probability. Prerequisite: 2 units of high school mathematics.

018. ELEMENTARY LINEAR ALGEBRA (3:3:0) Matrices and vectors; transformations; systems of linear equations; convex sets and linear programming. Prerequisite: 2 units of high school mathematics.

035. GENERAL VIEW OF MATHEMATICS (3:3:0) Survey of mathematical thought in logic, geometry, combinatorics, and chance.

036. INSIGHTS INTO MATHEMATICS (3:3:0) Examples of mathematical thought in number theory, topology, theory of symmetry, and chance. Prerequisite: 1 unit of algebra or MATH 004.

110. TECHNIQUES OF CALCULUS I (4:4:0) Functions, graphs, derivatives, integrals, techniques of differentiation and integration, exponentials, improper integrals, applications. Students may take only one course for credit from MATH 110, 140, and 140A. Prerequisite: MATH 005 or satisfactory performance on the mathematics (algebra) proficiency examination.



111. **TECHNIQUES OF CALCULUS II (2:2:0)** Analytic geometry, partial differentiation, maxima and minima, differential equations. Prerequisite: MATH 110.
140. **CALCULUS WITH ANALYTIC GEOMETRY I (4:4:0)** Functions; limits; analytic geometry; derivatives, differentials, applications; integrals, applications. Students may take only one course for credit from MATH 110, 140, and 140A. Prerequisites: MATH 006, 007; or MATH 040; or MATH 041; or satisfactory performance on the mathematics (both algebra and trigonometry) proficiency examination.
141. **CALCULUS WITH ANALYTIC GEOMETRY II (4:4:0)** Derivatives, integrals, applications; sequences and series; analytic geometry; polar coordinates; partial derivatives. Prerequisite: MATH 140 or 140A.
220. **MATRICES (2:2:0)** Systems of linear equations; matrix algebra; eigenvalues and eigenvectors; linear systems of differential equations. Prerequisite: MATH 110 or 140.
230. **CALCULUS AND VECTOR ANALYSIS (4:4:0)** Three-dimensional analytic geometry; vectors in space; partial differentiation; double and triple integrals; integral vector calculus. Students who have passed either MATH 231 or 232 may not schedule MATH 230 for credit. Prerequisite: MATH 141.
231. **CALCULUS OF SEVERAL VARIABLES (2:2:0)** Analytic geometry in space; differential and integral calculus of several variables. Students who have passed MATH 230 may not schedule this course. Prerequisite: MATH 141.
232. **INTEGRAL VECTOR CALCULUS (2:2:0)** Multidimensional analytic geometry; potential fields; flux; Green's divergence and Stokes's theorem. Students who have passed MATH 230 may not schedule this course. Prerequisite: MATH 231.
250. **ORDINARY DIFFERENTIAL EQUATIONS (3:3:0)** First- and second-order equations; numerical methods; special functions; Laplace transform solutions; higher order equations. Students who have passed MATH 251 may not schedule this course for credit. Prerequisite: MATH 141.
251. **ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS (4:4:0)** First- and second-order equations; numerical methods; special functions; Laplace transform solutions; higher order equations; Fourier series; partial differential equations. Prerequisite: MATH 141.
800. **BUSINESS MATHEMATICS (3:3:0)** Operations with whole numbers, fractions and mixed numbers, decimals and percent, formulas and equations, percentages and interest, introduction to algebra.
807. **TECHNICAL MATHEMATICS (5:5:0)** Algebraic expressions, exponents, radicals, equations, graphs, systems of equations, trigonometric functions, solution of right triangles, vectors, complex numbers. Prerequisite: MATH 004 or satisfactory performance on the mathematics proficiency examination.
808. **TECHNICAL MATHEMATICS AND CALCULUS (4:4:0)** Logarithm, inverse trigonometric functions, trigonometric identities, inequalities, series, limits, differentiation, higher order derivatives, implicit differentiation, applications, indefinite and definite integrals. Prerequisite: MATH 807.

## MECHANICAL ENGINEERING TECHNOLOGY (ME T)

800. **MECHANISMS (2:0:4)** Motion in machine elements; strength and properties of materials; design of machine elements. Prerequisite: E MCH 811.
805. **KINEMATICS (3:2:3)** Graphical and analytical studies of relative motions, instant centers, velocity and acceleration in plane motions, slider crank mechanisms, cams, gears, gear trains, and flexible connectors. Prerequisites: E G 001, E MCH 811.
807. **HEAT TRANSFER (3:3:0)** Basic principles of conduction, convection, and radiation, emphasizing practical applications.
810. **PRODUCT DESIGN (3:2:3)** Design of machine elements including levers, bearings, shafts, clutches, springs, and gears; selection of ball bearings and belts; design of small mechanical devices. Prerequisites: E MCH 813, ME T 805.
830. **SELECTED TOPICS IN MECHANICAL ENGINEERING TECHNOLOGY (3)** Individual or group



## METALLURGICAL ENGINEERING TECHNOLOGY

work in mechanical engineering technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

881. ELEMENTARY THERMO AND FLUID DYNAMICS (4:4:0) Basic problems in compressible fluid flow. Laws of dynamics and thermodynamics, mechanical properties of fluids, elementary heat transfer. Prerequisite or concurrent: MATH 808, PHYS 150.

882. AIR RESOURCE MANAGEMENT (2:2:0) Introduction to air pollution. Pollutants, sources, effects, air monitoring systems, air quality criteria and standards, governmental control programs and procedures.

884. SAMPLING AND MONITORING PROGRAM (2:0:4) Instrumentation and site selection, field data acquisition for major air pollutants, data analysis and evaluation.

## METALLURGICAL ENGINEERING TECHNOLOGY (MET E)

800. METALLURGICAL LABORATORY PRACTICE (4:2:4) Instruction and practice in various metallurgical techniques. Prerequisite: CHEM 011. Prerequisite or concurrent: PHYS 150.

801. PRINCIPLES OF EXTRACTIVE METALLURGY (2:2:0) An introduction to several metals' extraction processes using a problem-solving approach. Prerequisite: CHEM 012.

802. PHYSICAL METALLURGY (3:2:2) Structures of metals and alloys; structure manipulations; structure-property relationships. Prerequisites: CHEM 012, PHYS 150, MATH 807, MET E 800.

803. MATERIALS TESTING (3:1:4) Applications of testing procedures to determine properties of inorganic materials.

804. FERROUS METALLURGY (3:2:2) Making, shaping, and heat treatment of cast irons and steels. Prerequisites: CHEM 012, MET E 800.

805. NONFERROUS METALLURGY (3:2:2) Extraction of nonferrous metals from their ores and subsequent compositional adjustment by refining and alloying. Prerequisites: CHEM 012, MET E 800.

806. SUMMER FIELD PRACTICE (3) Practical experience in the metallurgical industries.

807. METALLURGICAL OPERATIONS (1:0:3) Plant trips to metals industries; classroom discussion with metallurgists concerning their work and the role of the metallurgical associate.

## METEOROLOGY (METEO)

003. INTRODUCTORY METEOROLOGY (3:2:2) Nontechnical treatment of fundamentals of modern meteorology; effect of weather and climate on man and his activities. A student who took METEO 002 may take the laboratory part of this course for 1 credit only.

## MICROBIOLOGY (MICRB)

106. ELEMENTARY MICROBIOLOGY (2:2:0) Importance of microorganisms in public health and disease, agriculture and industry; descriptive course for nontechnical students.

107. ELEMENTARY MICROBIOLOGY LABORATORY (1:0:3) Selected techniques with regard to recognition and enumeration of bacteria; effects of chemical and physical agents on microorganisms. Prerequisite or concurrent: MICRB 106.

150. INTRODUCTORY MEDICAL LABORATORY TECHNOLOGY (4:2:10) Introduction to basic principles and procedures of clinical laboratory work. Practicum emphasizes proper collection, handling, and preparation of biological samples. Prerequisite: admission to 2-MLT program.

151. SEMINAR AND PRACTICUM FOR MEDICAL LABORATORY TECHNICIANS (2-17 per semester, maximum of 28) Lectures and laboratory sessions introduce methods and procedures, underlying principles, and their applications in clinical practice. Prerequisites: MICRB 150, 201, 202, CHEM 034, BIOL 041.

*Unit A. Clinical Chemistry (9)* Basic principles and procedures for measuring chemical components of blood and other body fluids.

*Unit B. Clinical Microbiology/Serology* (6) Properties and identification of normal and abnormal microbial flora. Antigen-antibody interactions of diagnostic importance.

*Unit C. Hematology* (6) Red and white blood cell identification and enumeration. Related procedures for diagnosing normal or disease states.

*Unit D. Immunohematology* (5) Immunologic considerations necessary for the transfusion of blood and blood products.

*Unit E. Urinalysis* (2) Identification of cellular and crystalline urinary sediments. Qualitative chemical analysis of urine.

201. **INTRODUCTORY MICROBIOLOGY** (3:3:0) Elementary principles of microbial and viral interrelationships, morphology, and physiology; relation to food, water, soil, industry, and disease processes. Prerequisite: BIOL 101.

202. **INTRODUCTORY MICROBIOLOGY LABORATORY** (2:0:4) Qualitative and quantitative techniques with regard to recognition of bacteria and their processes on a microscopic, colonial, and physiological basis. Prerequisite: CHEM 012. Prerequisite or concurrent: MICRB 201.

## **MICROCOMPUTER PROCESSING (MCMP)**

840. **MICROPROCESSOR INTERFACING** (5:4:2) Examination of the devices used in microprocessor systems to communicate with external digital and analog systems. Prerequisite: EE T 810. Concurrent: EE T 811.

841. **ADVANCED MICROPROCESSOR SYSTEMS** (4:3:2) Development of an understanding of microprocessor principles and systems through a study of current 8- and 16-bit microprocessors. Prerequisite: EE T 811.

842. **MICROPROCESSOR SYSTEMS DESIGN AND ANALYSIS** (3:1:4) Experience in designing, constructing, and testing a complete microcomputer system and its practical application to control. Prerequisite: EE T 811.

## **MINERAL PROCESSING (MN PR)**

061. **INTRODUCTION TO COAL PREPARATION** (3:3:0) Theory and application of modern coal preparation practice. Sampling, crushing, sizing, gravity concentration, flotation, dewatering, drying; pollution control; flowsheets.

## **MINING (MNG)**

023. **MINERAL LAND AND MINE SURVEYING** (3:0:9) Surveying theory and practice applied to mineral lands and mines; traversing, leveling, mapping, shaft plumbing; stope, room, and development surveying. Prerequisites: E G 011, 1/2 unit of secondary school trigonometry.

030. **INTRODUCTION TO MINING ENGINEERING** (3:2:3) Examination, development, and exploitation of mineral deposits in case studies of mineral deposits and mines; unit operations, cycling, equipment, methods.

## **MINING TECHNOLOGY (MNG T)**

800. **MINING TECHNOLOGY ORIENTATION** (1:0:2) Films, slides, and lectures to acquaint the student with the coal mining industry and its impact on society.

801. **COAL MINING TECHNOLOGY** (3:2:3) Analysis of coal mining systems; integration of unit operations and mining methods for efficient mine production.

802. **MINE VENTILATION** (3:2:3) Quality and quantity analysis and control of mine atmosphere. Prerequisite or concurrent: CHEM 011, PHYS 150, MNG T 801.

803. **STRATA CONTROL** (3:2:3) Fundamentals of stresses and strains in rocks; virgin and concentrated stresses; roof support, subsidence, bursts, and stability control. Prerequisite: E MCH 811. Prerequisite or concurrent: MNG T 801.

## MUSIC

804. **MINE PLANT TECHNOLOGY (3:2:3)** Electrical systems in mines; mechanical power applications and materials handling systems. Prerequisite: PHYS 150.
805. **MINE SYSTEMS TECHNOLOGY (3:2:3)** Quantitative methods of work measurement and their application to production and method study problems related to mines. Prerequisite: MNG T 801.
806. **MINE MANAGEMENT AND LAW (3:3:0)** The problems of the individual in coal mine management in relation to environment, employer, union, and law.
807. **ELECTRICAL MINE MACHINE CIRCUITS (3:2:3)** Topics of electrical power fundamentals, power and control circuits, motors and their mine applications will be covered. Prerequisite: MNG T 804.
808. **MINE POWER DISTRIBUTION (3:2:3)** Topics of high voltage circuits, underground transmission, power stations, power conversion, safety regulations, and power devices will be covered. Prerequisite: MNG T 804.
809. **MINE MACHINERY HYDRAULICS (3:2:3)** Topics of basic hydraulic principles and their application to mining and mine machinery will be covered. Prerequisites: MATH 807, PHYS 150.
810. **MINE MACHINE DYNAMICS (3:2:3)** Topics on basic machines and their application to the principles of mine machine operation will be covered. Prerequisites: E MCH 811, PHYS 150.
811. **PRACTICUM IN MINE MAINTENANCE (3:0:9)** Field and shop techniques in procedures of electrical, mechanical, and hydraulic phases of mine maintenance will be covered. Prerequisites: MNG T 804, PHYS 150.
815. **SURFACE MINING TECHNOLOGY (3:2:3)** Analysis of surface mining systems; integration of unit operations and equipment utilization for efficient operation. Prerequisite: MNG T 800.
816. **ELEMENTS OF SURFACE MINE DESIGN (3:2:3)** Exploration methods, pit planning, and design; drilling and fragmentation; loading and haulage systems; and slope stability. Prerequisite: MNG T 815.
817. **SURFACE MINING PRODUCTION TECHNOLOGY (3:2:3)** Application of time study and work measurement to surface production. Efficiency of equipment usage and equipment utilization scheduling. Prerequisite: MNG T 815.
818. **SURFACE MINING HYDROLOGY (3:3:0)** Water control and treatment; hydrologic studies before and after mining; impoundments and water treatment. Prerequisites: CHEM 011; GEOSC 001 or 020 or 101.
819. **RECLAMATION TECHNOLOGY (3:3:0)** Spoil-bank reclamation and contour grading; revegetation and reclaimed land utilization.

## MUSIC (MUSIC)

005. **THE FUNDAMENTALS OF MUSIC APPRECIATION (3:3:0)** Recitation and lectures with recorded examples of melody, harmony, rhythm, vocal and instrumental timbre, form, and program and absolute music.
008. **RUDIMENTS OF MUSIC (3:3:0)** Introduction to the elements of music: notation, scales, meter, rhythm, intervals; basic chord structure. For non-Music majors.

## NUCLEAR ENGINEERING TECHNOLOGY (NE T)

801. **RADIOLOGICAL SAFETY (2:2:0)** Discussion of basic radiation dose units, radiation monitoring techniques, biological effects of radiation, and government regulations. Prerequisite or concurrent: NE T 802.
802. **ELEMENTS OF NUCLEAR TECHNOLOGY (4:4:0)** Atomic and nuclear structure, electromagnetic radiation, nuclear radiations, nuclear interactions, neutron diffusion, and reactor materials. Prerequisites: MATH 808, PHYS 151.
803. **ELEMENTS OF NUCLEAR POWER GENERATION (3:3:0)** Survey of various reactor types, with emphasis on fuel heat removal and power generation, fuel fabrication and reprocessing. Prerequisites: NE T 802, ME T 807.



804. **INTRODUCTION TO REACTOR TECHNOLOGY (3:3:0)** Steady state reactor theory, kinetic behavior of reactors, shielding, and reactor control systems. Prerequisite: NE T 802.
805. **PRINCIPLES OF MEASUREMENT (3:2:2)** A study of measurement in the nuclear industry, including the instruments used, accuracy of measurement, and statistical justification. Prerequisites: EE T 814, PHYS 151.
812. **NUCLEAR TECHNOLOGY LABORATORY (3:1:4)** Laboratory study of radiation measurements and the diversified application of nuclear techniques. Prerequisites: NE T 801, 805.
814. **REACTOR TECHNOLOGY LABORATORY (3:1:4)** Laboratory study of basic reactor experiments, control rod calibration, critical experiment, etc. Emphasis placed upon reactor operations. Prerequisites: NE T 801, 805. Concurrent: NE T 804.
820. **ELECTRICAL GENERATION ORIENTATION (1:1:0)** Introduction and comparison of methods of generating electricity; description of the variety of occupations in the electrical generating industry.
821. **INTRODUCTORY BOILING WATER REACTOR TECHNOLOGY (1:1:0)** Introduction to the concept of commercial power generation of electricity through the use of a boiling water reactor.
822. **POWER PLANT QUALITY ASSURANCE/QUALITY CONTROL (1:1:0)** Introduction to concepts of quality assurance/quality control; historical development of standards and regulatory guides; specific applications to nuclear plants.
830. **SELECTED TOPICS IN NUCLEAR ENGINEERING TECHNOLOGY (3)** Individual or group work in nuclear engineering technology for students with specific occupational objectives. Prerequisite: third-semester standing.

## **NUTRITION (NUTR)**

150. **ELEMENTARY NUTRITION (2:2:0)** Fundamentals of nutrition and its relation to human health. Students who have passed NUTR 251 may not schedule this course.
251. **INTRODUCTORY PRINCIPLES OF NUTRITION (3:3:0)** The nutrients: food sources and physiological functions as related to human growth and well-being throughout life; current nutrition issues. Students who have passed NUTR 150 may not schedule this course.
252. **DIET THERAPY AND NUTRITION CARE IN DISEASE (4:3:2)** Principles of nutrition care to meet therapeutic needs, inpatient care, and rehabilitation. Prerequisite: NUTR 251 or 801.
801. **NUTRITION COMPONENT OF THE FOOD SERVICE SYSTEM (3:3:0)** Introduction to basic nutrition principles and their application in a food service system.

## **OPERATIONS MANAGEMENT (OPMGT)**

801. **PRODUCTION AND OPERATIONS MANAGEMENT (3:3:0)** Quantitative tools and techniques used in managing the production function of a firm; including inventory control, production scheduling, capacity planning. Prerequisites: MGMT 100, Q B A 801.

## **PHILOSOPHY (PHIL)**

001. **CRITICAL THINKING AND ARGUMENT (3:3:0)** Principles of correct thinking; deductive and inductive inference; use and misuse of language in reasoning.
002. **EXISTENTIALISM (3:3:0)** Exploration of a controversial modern mode of philosophizing about life, death, absurdity, and faith.
003. **ETHICS AND SOCIAL ISSUES (3:3:0)** Ethical issues such as war, privacy, crime and punishment, racism and sexism, civil liberties, affirmative action, abortion, and euthanasia.
004. **BASIC PROBLEMS OF PHILOSOPHY (3:3:0)** Issues such as the foundations of knowledge, the existence of God, the problem of freedom, and the nature of reality.
012. **ELEMENTS OF SYMBOLIC LOGIC (3:3:0)** Translating arguments into symbolic form and establishing validity. For nonscience majors.



## PHYSICAL EDUCATION

100. **THE MEANING OF HUMAN EXISTENCE (3:3:0)** A study of some philosophical ways of viewing the purpose of life, the good life, and history and its meaning.
103. **MORAL VALUE (3:3:0)** Freedom, choice, and obligation in conduct; values and the foundations of ethics.
104. **ETHICS AND THE PROFESSIONS (3:3:0)** The philosophical basis for the ethics of professional practice; illustrations include law, business, public administration, journalism, engineering, teaching, medicine.
105. **INTRODUCTION TO THE PHILOSOPHY OF LAW (3:3:0)** Topics normally include concepts of law and responsibility, justice and punishment, legal ethics, and the limits of law.
106. **BUSINESS ETHICS (3:3:0)** A study of ethical issues which confront the business community. Designed primarily for majors in the College of Business Administration.
108. **SOCIAL AND POLITICAL PHILOSOPHY (3:3:0)** Philosophical analysis of political and communal order; theories of individual and group action within the structures of social obligation.
111. **ORIENTAL PHILOSOPHY (3:3:0)** Study of philosophical, aesthetic, and religious ideas in the classics of Eastern thought.
212. **SYMBOLIC LOGIC (3:3:0)** The logic of propositions, relations, and quantification; the nature and properties of formal systems. Intended primarily for science-oriented students.

## PHYSICAL EDUCATION (PH ED)

001. **FITNESS FOR LIFE (1:1:2)** Effecting change in life-style and enhancing well-being through knowledge, understanding, and commitment to fitness. Students who have received credit for PH ED 005, Personal Fitness, may not schedule this course.
005. **PHYSICAL EDUCATION (1:0:3 per semester)** Full-semester activity courses to develop physical and recreational skills. Selection from aerobic dance, jazz dance, modern dance, orienteering, outdoor living skills, personal fitness, sailing, scuba, strength training, and others.
006. **PHYSICAL EDUCATION (½:0:3 per first half of semester)** Activity to develop physical and recreational skills. Selection from archery, badminton, basketball, bowling, canoeing, fencing, field hockey, golf, handball, hunter safety, ice skating, jogging, lacrosse, racquetball, riflery, sailing, skiing, soccer, squash, swimming, tennis, volleyball, and others. Activities offered on a seasonal basis. First half semester course.
007. **PHYSICAL EDUCATION (½:0:3 per second half of semester)** See description for PH ED 006. Second half semester course.
009. **LIFE SAVING AND WATER SAFETY (1:0:3)** Course outlined by the American Red Cross; prepares the student for the Advanced Life Saving examination. Prerequisite: passing of qualifying swimming test.
011. **WATER SAFETY INSTRUCTOR (1:0:3)** The American Red Cross aquatic instructor's course, including swimming, diving, life saving, water safety. Prerequisite: students wishing to take instructor's examination must have a recent Red Cross Advanced Life Saving certificate.

## PHYSICAL SCIENCE (PH SC)

007. **PHYSICAL SCIENCE (3:3:0)** Development of physics, including modern physical concepts and their relationship to the careers of physical scientists. May not be scheduled by students who have received credit for PHYS 100, 201, 215, or 221.
008. **PHYSICAL SCIENCE (3:3:0)** Selected concepts of chemistry showing their development, interrelationship, and present status. May not be scheduled by students who have received credit for CHEM 011 or 012.

## PHYSICIAN'S ASSISTANT (P A)

800. **BASIC MEDICAL AND CLINICAL SCIENCES I (7:7:0)** Introduction to principles of the basic and clinical sciences related to providing care to patients in a primary-care setting.

801. **BASIC MEDICAL AND CLINICAL SCIENCES II (7:7:0)** Continuation of P A 800. Principles of the basic and clinical sciences related to providing care to patients in a primary-care setting. Prerequisite: P A 800.
805. **MICROBIOLOGY (1:1:0)** Introduction to the principles of clinical microbiology useful to a physician's assistant functioning in a primary-care setting.
810. **HUMAN BEHAVIOR (3:3:0)** Introduction to the principles of psychiatry and behavioral medicine relevant to medical care in the primary-care setting.
820. **PATIENT-ORIENTED CARE I (3:2:8)** Introduction of a comprehensive approach to care of the patient in the family context.
821. **PATIENT-ORIENTED CARE II (3:2:8)** Continuation of P A 820. Introduction to patient and family care in the context of health care systems. Prerequisite: P A 820.
840. **CLINICAL SKILLS FOR PHYSICIAN'S ASSISTANT I (2:1:4)** Technical skills development necessary to prepare the student in the clinical skills areas required during the primary health care practicum.
841. **CLINICAL SKILLS FOR PHYSICIAN'S ASSISTANT II (2:1:4)** Continuation of P A 840. Technical skills development necessary to prepare the student in the clinical skills areas required during the primary health care practicum. Prerequisite: P A 840.
850. **THERAPEUTICS (3:3:0)** Introduction to basic applied clinical pharmacology with emphasis on chemical therapeutic agents commonly used with primary-care patients.
870. **PEDIATRICS (1:1:0)** Introduction to the principles of pediatric primary care.
871. **GERIATRICS (1:1:0)** Introduction to the unique social, psychological, and medical-surgical problems of the aging patient.
878. **CATEGORICAL EXPERIENCES (9:0:40)** Clinical rotations in categorical areas appropriate to physician's assistant clinical skills development.
880. **PRACTICUM IN PRIMARY HEALTH CARE DELIVERY I (15:0:40)** Preceptorship with primary-care physician. Emphasis on health appraisal, evaluation of patient problems, and implementation of care. Prerequisite: P A 878.
881. **PRACTICUM IN PRIMARY HEALTH CARE DELIVERY II (15:0:40)** Continuation of P A 800. Preceptorship with primary-care physician. Emphasis on health appraisal, evaluation of patient problems, and implementation of care. Prerequisite: P A 880.

## PHYSICS (PHYS)

150. **TECHNICAL PHYSICS (3:2:2)** Elementary treatment of topics in mechanics, heat, wave motion, and sound leading toward an understanding of technical applications. Prerequisite: 1½ units of algebra. Prerequisite or concurrent: MATH 807.
151. **TECHNICAL PHYSICS (3:2:2)** Elementary treatment of topics in electricity, light, and modern physics leading toward an understanding of technical applications. Prerequisite: PHYS 150.
201. **GENERAL PHYSICS (4:4:0)** Mechanics. Concurrent: MATH 140.
202. **GENERAL PHYSICS (4:3:2)** Electricity and magnetism. Prerequisite: PHYS 201. Concurrent: MATH 141.
203. **GENERAL PHYSICS (3:3:0)** Wave motion and thermodynamics. Prerequisite: PHYS 202.
204. **GENERAL PHYSICS (4:3:2)** Wave motion and thermodynamics, with laboratory. Prerequisite: PHYS 202.
215. **INTRODUCTORY PHYSICS (4:3:2)** Selected topics in mechanics, heat, and sound. Prerequisite: algebra to quadratics.
237. **INTRODUCTION TO QUANTUM PHYSICS (3:3:0)** Relativity and quantum theory applied to selected topics in atomic, molecular, solid state, and nuclear physics. Concurrent: PHYS 203 or 204 or 224.
265. **INTRODUCTORY PHYSICS (4:3:2)** Selected topics in light, electricity, and magnetism. Prerequisite or concurrent: PHYS 215.
297. **SPECIAL TOPICS (1-9)**

## **POLITICAL SCIENCE (PL SC)**

001. AMERICAN NATIONAL GOVERNMENT (3:3:0) Development and nature of American political culture; constitutional and structural arrangements; policy-making processes; sources of conflict and consensus.
002. AMERICAN PUBLIC POLICY (3:3:0) Examination of selected areas of public policy in America. Analysis of policy content, alternatives, and impact. Prerequisite: PL SC 001.
003. GOVERNMENT AND POLITICS IN MODERN SOCIETY (3:3:0) Introduction to study of government and politics. Normative and empirical theories; governmental functions in modern communities; representative structures and processes.
014. INTERNATIONAL RELATIONS (3:3:0) Characteristics of modern nation-states and forces governing their international relations; nationalism; imperialism; diplomacy; current problems of war and peace. Credit will not be given for both this course and INT U 200.
020. COMPARATIVE POLITICS—WESTERN EUROPE (3:3:0) Comparative analysis of political cultures, interest groups, parties, and decision-making processes in principal Western European political systems.

## **PSYCHOLOGY (PSY)**

002. PSYCHOLOGY (3:3:0) Introduction to general psychology; principles of human behavior and their applications.
015. ELEMENTARY STATISTICS IN PSYCHOLOGY (4:3:2) Frequency distributions and graphs; measure of central tendency and variability; normal probability curve; elementary sampling and reliability; correlations; simple regression equations. Prerequisites: PSY 002; MATH 005 or 2 units of secondary school algebra.
021. CURRENT APPLICATIONS OF PSYCHOLOGY (3:3:0) Topics may be drawn from but not limited to opinion research, selection and placement, behavior modification, attitude measurement and change. Prerequisite: PSY 002.
037. MENTAL HEALTH (3:3:0) Maintaining adjustment, developing a well-balanced personality; behavior disorders and their treatment. May not be used as a prerequisite for any course in Psychology. Not open to Psychology majors or those who have received credit for PSY 437.
170. PSYCHOLOGY OF WOMEN (3:3:0) Psychology of women in historical perspective and present evolvement. Stresses women's self-concepts with relation to individual and social psychological health. Prerequisite: PSY 002.
174. (SOC 174) PSYCHOLOGICAL AND SOCIOLOGICAL ASPECTS OF DEATH (3:3:0) An introductory, interdisciplinary approach to the psychology and sociology of death, stressing the significance of, and attitudes toward, mortality. Prerequisites: PSY 002, SOC 001.
202. INTRODUCTION TO PERCEPTION (3:3:0) Survey of human perception and processing of perceptual information, with some reference to animal literature. Emphasizes vision and audition. Prerequisite: PSY 002.
203. NEUROLOGICAL BASES OF HUMAN BEHAVIOR (3:3:0) An introduction to biopsychology, emphasizing the structure and function of the human brain.
204. INTRODUCTION TO LEARNING (3:3:0) A general survey of the learning area, including animal and human experiments, with the applicability of learning principles being discussed. Prerequisite: PSY 002.
211. VOCATIONAL BEHAVIOR (3:3:0) Theories of vocational selection and career change; research and application.
213. INTRODUCTION TO DEVELOPMENTAL PSYCHOLOGY (3:3:0) Developmental principles; physical growth; linguistic, intellectual, emotional, and social development from infancy to maturity. Prerequisite: PSY 002.
220. (LING 120) INTRODUCTION TO PSYCHOLINGUISTICS (3:3:0) The learning of language; language development in the child; meaning as a problem for psychology. Prerequisite: PSY 002.
221. INTRODUCTION TO COGNITIVE PSYCHOLOGY (3:3:0) Introduction to study of such higher



mental processes as thinking and reasoning, imagery, concept formation, problem solving, and skilled performance. Prerequisite: PSY 002.

231. **INDUSTRIAL PSYCHOLOGY (3:3:0)** Personnel selection, training, accident prevention, morale, and organizational behavior. Prerequisites: PSY 002; PSY 015 or STAT 200.

236. (RL ST 236) **PSYCHOLOGIES OF RELIGION (3:3:0)** Introduction to major Western psychologies of religion (James, Freud, Jung) and to subsequent extensions of and departures from them.

237. (RL ST 237) **RELIGIONS, CULTURES, AND THERAPIES (3:3:0)** Comparison of methods and goals of selected religious and secular therapies within their cultural contexts. Prerequisite: PSY 002.

296. **INDEPENDENT STUDIES (1-18)**

## **QUANTITATIVE BUSINESS ANALYSIS (Q B A)**

101. **INTRODUCTION TO QUANTITATIVE BUSINESS ANALYSIS (3:3:0)** Introduction to quantitative methods for conceptualizing business and management problems. Prerequisite: MATH 018 or 110.

102. **ELEMENTARY BUSINESS STATISTICS (3:3:0)** Statistical inference; estimation, hypothesis testing, testing, correlation, and regression; application of statistical techniques to economic and business problems. Prerequisite: Q B A 101.

801. **ELEMENTARY BUSINESS STATISTICS (3:3:0)** Collection, tabulation, measurement, presentation, and interpretation of quantitative material. Prerequisite: third-semester standing.

## **RADIOLOGIC TECHNOLOGIST RADIOGRAPHER (R T R)**

101. **ORIENTATION AND MEDICAL TERMINOLOGY (3:3:9)** Radiology history, radiation protection principles, medical ethics, with introduction to medical profession's language.

102. **RADIOGRAPHIC POSITIONING I: NURSING PROCEDURES/CONTRAST MEDIA (3:3:9)** Basic positional terminology; emphasis on skeleton with introduction to skull; radiological applications of contrast media and nursing pertinent to radiology. Prerequisite: R T R 101.

103. **RADIOGRAPHIC EXPOSURE I: FILM CRITIQUE I (3:4:17)** Preliminary exposure factors concerning radiographic imaging; evaluation of radiographic films. Prerequisite: R T R 102.

104. **RADIOGRAPHIC POSITIONING II: SPECIAL PROCEDURES (3:3:13)** Cranium and body system positioning; invasive contrast procedures pertinent to radiology. Prerequisite: R T R 103.

105. **RADIOGRAPHIC EXPOSURE II: DARKROOM CHEMISTRY; FILM CRITIQUE II (3:3:13)** Continuation of exposure factors concerning radiographic imaging, with emphasis on problem solving, evaluation of radiographs, and radiographic chemistry with processing techniques. Prerequisite: R T R 104.

106. **RADIOGRAPHIC POSITIONING III: MEDICAL/SURGICAL DISEASES (3:5:17)** Review of skeletal, cranium, and body systems, with emphasis on specialized positioning. Definition of various pathologies pertinent to bodily systems. Prerequisites: R T R 105, BIOL 041.

107. **REGISTRY REVIEW I AND II (3:5:17)** Registry Review I and II includes material in all required R T R courses, with emphasis upon national board examination. Prerequisite: R T R 106.

## **READING, COMMUNICATION, AND LANGUAGE EDUCATION (RCLED)**

005A. **COLLEGE READING SKILLS IMPROVEMENT (2:2:0 per semester, maximum of 4)** Improving reading comprehension, vocabulary, rate, study skills, and integrating these more efficiently in course work. Average or better readers seeking advanced work or preparation for specific goals.

005B. **COLLEGE READING SKILLS IMPROVEMENT (2:2:0)** Improving reading comprehension,



## **REAL ESTATE**

vocabulary, rate, study skills, and integrating these more efficiently in course work. Limited to students needing developmental reading instruction and recommended on the basis of reading entrance test scores.

### **REAL ESTATE (R EST)**

100. **SURVEY OF REAL ESTATE (3:3:0)** Study of real estate to enable individuals to make successful transactions and decisions. Not available to Business students or to those who have taken R EST 301.

301. **REAL ESTATE PRINCIPLES (3:3:0)** Introduction to urban real estate; economic forces affecting property rights; real estate markets and finance; land-use analysis; and government policies.

800. **REAL ESTATE PRINCIPLES (3:3:0)** Nature of the real estate market; introduction to the functions performed in the real estate business.

810. **REAL ESTATE SALES (3:3:0)** Principles underlying the sale of real estate; the use of selling tools and procedures in the analysis of customers' needs.

830. **REAL ESTATE FINANCE (3:3:0)** Basic principles of real estate finance; sources of funds for financing real estate.

### **RELIGIOUS STUDIES (RL ST)**

001. **INTRODUCTION TO THE STUDY OF RELIGION (3:3:0)** An historical and comparative survey of the principal beliefs and practices of the world's major religions.

019. **RELIGION IN AMERICAN LIFE AND THOUGHT (3:3:0)** The function, contributions, tensions, and perspectives of religion in American culture.

### **RETAILING (RTL)**

840. **MANAGEMENT IN THE HOME (3:3:0)** The principles of decision making, work simplification, use of equipment, and home safety applied to family management.

850. **DISPLAY TECHNIQUES (2:1:3)** Display as visual communication, emphasizing the techniques related to merchandising and art. Prerequisite: an art or art appreciation course.

### **SCIENCE, TECHNOLOGY, AND SOCIETY (S T S)**

100. **THE ASCENT OF MAN (3:3:0)** A survey of some of the intellectual achievements which highlight mankind's attempts to understand nature and shape the environment.

### **SOCIAL SCIENCE (SO SC)**

001. **THE URBANIZATION OF MAN: A SOCIAL SCIENCE PERSPECTIVE (3:3:0)** An overview of the social sciences, including an interdisciplinary analysis of the urban process.

002. **CONTEMPORARY MAN AND SOCIETY (3:3:0)** Selected contemporary issues in the perspective of history, sociology, psychology, economics, and political science.

110. **INTRODUCTION TO CONTEMPORARY AFRICA (3:3:0)** Consideration of influences and forces at work; leaders, elites, and groups. Analysis of problems and issues in Africa.

297. **SPECIAL TOPICS (1-9)**

### **SOCIOLOGY (SOC)**

001. **INTRODUCTORY SOCIOLOGY (3:3:0)** The nature and characteristics of human societies and social life.

003. **INTRODUCTORY SOCIAL PSYCHOLOGY (3:3:0)** The impact of the social environment on perception, attitudes, and behavior.
005. **SOCIAL PROBLEMS (3:3:0)** Current social problems such as economic, racial, and gender inequalities; social deviance and crime; population, environmental, energy, and health problems.
007. **INTRODUCTION TO SOCIAL RESEARCH (3:3:0)** Fundamental concepts and problems in social science research; design, measurement, sampling, causation, validity, interpretation. Prerequisite: 3 credits in sociology.
012. **CRIMINOLOGY (3:3:0)** Explanations and measurement of crime; criminal law; characteristics of criminals and victims; violent, property, white-collar, organized, and sexual crimes.
013. **JUVENILE DELINQUENCY (3:3:0)** Juvenile conduct, causes of delinquency, current methods of treatment; organization and function of agencies concerned with delinquency.
015. **URBAN SOCIOLOGY (3:3:0)** City growth and decline; impact of city life on individuals, families, neighborhoods, and government; urban life-styles.
023. **POPULATION AND POLICY ISSUES (3:3:0)** Local, national, and international population trends; basic techniques of demographic analysis; population problems; implications for public planning and policy.
030. **SOCIOLOGY OF THE FAMILY (3:3:0)** Family structure and interaction; functions of the family as an institution: cross-cultural comparisons.
047. **(S T S 047) WILDERNESS, TECHNOLOGY, AND SOCIETY (3:3:0)** Impact of developments in science, literature, and art on changing attitudes toward nature; consequences for conservation, preservation, environmental ethics.
055. **WORK IN MODERN SOCIETY (3:3:0)** The nature of work in varied occupational and organizational settings; current trends and work life in the future.

## **SOLAR TECHNOLOGY (S T)**

801. **INTRODUCTION TO SOLAR TECHNOLOGY (2:1:2)** Introduction to solar technology from the standpoint of history, ecology, and energy.
804. **ANALYSIS OF SOLAR HEATING AND COOLING SYSTEMS (3:1:5)** Comprehensive analysis and application of solar heating and cooling systems. Calculations and layout. Prerequisite: fourth-semester standing.
806. **PASSIVE SYSTEMS AND CONSERVATION METHODS (3:3:0)** Passive concepts and designs; earth sheltering; energy audits and conservation techniques; wood burning equipment.
807. **LIQUID SPACE HEATING AND DOMESTIC HOT WATER SYSTEMS (3:2:2)** Liquid collectors, storage, and domestic hot water systems; pumps and piping; heat exchangers; fluid and component selection; power and controls. Prerequisites: S T 801, ME T 881.
808. **AIR SYSTEMS AND CONVENTIONAL HEATING EQUIPMENT (3:2:2)** Air collector and storage systems; fans and ductwork; heat exchange coils; controls; conventional-fired equipment operation. Concurrent: S T 807.
809. **NONTECHNICAL ASPECTS OF SOLAR TECHNOLOGY (3:2:2)** System sizing with f-chart method; economic analysis techniques; cost estimating; job scheduling; legal aspects; warranties; solar cooling methods and economics. Prerequisite: S T 801.
830. **SELECTED TOPICS IN SOLAR HEATING AND COOLING TECHNOLOGY (3)** Individual or group work in solar heating and cooling technology offered at certain campuses for second-year students with specific occupational objectives. Prerequisite: third-semester standing.

## **SPANISH (SPAN)**

001. **ELEMENTARY SPANISH I (4:3:2)** Audio-lingual approach to basic Spanish; writing. Students who have received high school credit for two or more years of Spanish may not schedule this course for credit without permission of the department.

## **SPEECH COMMUNICATION**

002. **ELEMENTARY SPANISH II (4:3:2)** Audio-lingual approach to basic Spanish continued; writing. Students who have received high school credit for four years of Spanish may not schedule this course for credit without permission of the department. Prerequisite: SPAN 001.
003. **INTERMEDIATE SPANISH (4:3:2)** Audio-lingual review of structure; writing; reading. Prerequisite: SPAN 002.
010. **INTENSIVE SPANISH (6:5:2)** Basic Spanish grammar; oral, aural, and writing skills. Essentially equivalent to SPAN 001, 002, 003, but in accelerated five periods per week module.
020. **INTENSIVE SPANISH (6:5:2)** Continuation of SPAN 010. Prerequisite: SPAN 010.
130. **IBERIAN CIVILIZATION (3:3:0)** Spanish and Portuguese life from the medieval period to the present; literature, the arts, and contemporary problems in historical perspective.
131. **IBERO-AMERICAN CIVILIZATION (3:3:0)** Spanish American and Brazilian life from the Conquest to the present: literature, art, the indigenous heritage, and contemporary problems.
230. **MASTERPIECES OF SPANISH LITERATURE IN ENGLISH TRANSLATION (3:3:0)** Emphasis on works and authors of international importance. Lectures, readings, and written work in English.
231. **MASTERPIECES OF SPANISH AMERICAN LITERATURE IN ENGLISH TRANSLATION (3:3:0)** Emphasis on works and authors of international importance. Lectures, readings, and written work in English.

## **SPEECH COMMUNICATION (SPCOM)**

100. **EFFECTIVE SPEECH (3:3:0)** Introduction to speech communication: formal speaking, group discussion, analysis and evaluation of messages.

*Unit A.* Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation.

*Unit B.* Principles of communication, implemented through group problem solving, with some attention to formal speaking and message evaluation.

*Unit C.* Principles of communication, implemented through analysis and evaluation of messages, with some attention to formal speaking and group discussion.

## **STATISTICS (STAT)**

200. **ELEMENTARY STATISTICS (4:3:2)** Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. Prerequisite: 2 units in algebra.
318. **ELEMENTARY PROBABILITY (3:3:0)** Combinatorial analysis, axioms of probability, conditional probability and independence, discrete and continuous random variables, expectation, limit theorems, additional topics. Prerequisite: MATH 141.

## **TELECOMMUNICATIONS (TELCM)**

840. **INTRODUCTION TO TELECOMMUNICATIONS SYSTEMS (2:2:0)** Elements of telecommunications systems, including telephones, transmission lines, switching, digital data, and transmission by microwave, satellite, and fiber optics.
841. **SWITCHING AND TRAFFIC (3:3:0)** Routing of telecommunications messages: characteristics, methods, and control. Prerequisite: TELCM 840.
842. **INTRODUCTION TO TELECOMMUNICATIONS LABORATORY (1:0:2)** Techniques used for measurements of basic telecommunications circuits and equipment. Prerequisite or concurrent: TELCM 841.
843. **TRANSMISSION (3:3:0)** Transmission of telecommunications information, including design problems. Prerequisite: TELCM 840.
844. **ADVANCED TELECOMMUNICATIONS LABORATORY (1:0:2)** Testing and measurement of advanced telecommunication transmission and switching equipment, including practical alignment and testing of operational systems. Prerequisite or concurrent: TELCM 843.



## THEATRE ARTS (THEA)

- 100. THE ART OF THE THEATRE (3:3:0) Survey of the history, craft, and art of the theatre to support an informed appreciation of theatrical events.
- 102. FUNDAMENTALS OF ACTING (3:3:0) Introduction to performance skills for the student with a general interest in acting.
- 103. FUNDAMENTALS OF DIRECTING (3:3:0) Training and experience in basic skills of directing. Designed for non-Theatre majors.
- 104. FUNDAMENTALS OF THEATRE PRODUCTION (3:3:0) Training and experience in basic skills of technical theatre. Designed for non-Theatre majors.
- 109. THE DRAMATIC ARTS IN THE MASS MEDIA (3:3:0) The place of television-radio-film drama in our culture; relationship with other art forms; standards of evaluation.
- 210. INTRODUCTION TO CREATIVE DRAMATICS (3:1:4) Introduction and direct experience in creative dramatics and survey of children's theatre.
- 296. INDEPENDENT STUDIES (1-18)

## WILDLIFE (WILDL)

- 101. INTRODUCTION TO WILDLIFE MANAGEMENT (3:3:0) Basic principles of wildlife management. Introduction to general ecology and wildlife population dynamics.
- 103. ANIMAL IDENTIFICATION (3:2:3) Identification of mammals, birds, reptiles, amphibians; introduction to their life histories.
- 204. WILDLIFE MENSURATION (3:3:0) Estimation and analysis of animal populations, including sampling considerations and basic biometry. Prerequisite: 3 credits in mathematics.
- 207. OUTDOOR RECREATION (3:2:3) Sociology, history, and economics of recreational demand; recreational areas and management procedures.
- 208. TERRESTRIAL WILDLIFE MANAGEMENT (3:2:4) Ecological characteristics and manipulation of terrestrial habitats; control of wildlife populations. Prerequisites: FOR 203, 240, WILDL 101, 103, 204, 802.
- 209. ANIMAL HANDLING AND CARE (3:2:3) Techniques in capturing, marking, and maintaining wild animals in captivity. Necropsy procedures to determine physical condition and cause of death. Prerequisite: WILDL 101.
- 211. AERIAL PHOTO INTERPRETATION (4:2:6) Techniques of photo interpretation; type mapping of wildlife environments; photo censusing of wild animals.
- 213. WETLAND AND FISHERIES MANAGEMENT (3:3:3) Introduction to basic limnology. Ecology and management of swamp, marsh, pond, and stream habitats and their animal populations. Prerequisites: WILDL 101, 103, 204, 802.
- 802. RECONNAISSANCE SURVEYS (3:2:3) Use of topographic maps and hand-held compasses; survey methods using the staff compass, abney level, steel tape, and pacing. Reconnaissance mapping.
- 805. FIELD AND LABORATORY TECHNIQUES (3:2:8) Techniques used in wildlife research and management. Prerequisites: WILDL 101, 103, 802, FOR 203. Concurrent: WILDL 806.
- 806. OPERATIONAL PROCEDURES AND EQUIPMENT (2:2:6) Operational procedures for wildlife-related equipment and facilities; field trips to wildlife management areas. Concurrent: WILDL 805.

## WOMEN'S STUDIES (WMNST)

- 200. WOMEN'S STUDIES (3:3:0) Interdisciplinary consideration of the scholarly theories and research pertaining to women's experiences and women's status in contemporary American society.



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